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Enhancing UX in washrooms utilising visitor-targeted communication

Master of Science Thesis in the Master Degree Programme
Industrial Design Engineering

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Abstract

Essity is a leading global hygiene company that provide professional washroom solutions under the brand TORK. As service solutions in general is a growing market and as Internet of Things (IoT) is a trend that gets stronger and stronger, Essity see potential in a new area of solutions in washrooms related to communication. The purpose of this project was to investigate how Essity can provide a communication solution under the brand Tork that communicate with and/or to the visitor in public washrooms, and that further elicits a better user experience for the visitor by utilizing new technology. The aim was to define user and customer needs, convert them in a concept development process to create a communication solution that lastly would be tested and evaluated. The final result of the project was guidelines of how to enhance user experience in public washrooms and of how to include customer beneficial communication.

A washroom is not a site commonly used for communication purposes. There are a few current solutions for visitor-feedback or for displaying information to the visitor where the focus is the information only with little concern of the user experience. Interviews with potential customers to Essity showed that there is a need of communication solutions, both regarding hygiene in washrooms but also to be able to reach out to the visitors in a convenient way. The largest user needs were not directly related to communication but concerned getting a hygienic and private experience in the washroom. An analysis of customer and user needs were concluded to a desired effect that a communication solution should reach: “A better user experience and increased communication values in the washroom”.

The report describes how the formulated effect was used as a foundation in the concept development which resulted in eight concepts that were evaluated and redesigned in an iterative process to one final concept called SoliQube. This was a total solution placed inside the washroom (cubicle or single washroom) that enabled multisensory experiences through the use of added sound, scent and digital image, that moreover held information and feedback possibilities. The functionalities were developed and evaluated in two parts, the interaction and the impression, and showed that interactive gesture control and the multisensory impressions elicited a better user experience of the washroom through among other increased experience of privacy and hygiene. The conclusions from the project was that the final concept SoliQube could help to elicit a better user experience in washrooms as well as enable beneficial communication for the customers. It was moreover deemed a flexible solution that has potential to keep up with trends, and thus berelevant also in the future.

Acknowledgements

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Finally, a big thanks to our loved ones for the unconditional support and encouragement!

Table of Content

Definitions and glossary

Communication
Transfer of information between people, animals, plants or devices (Kommunikation, n.d.)

Congruent
The quality of being similar to or in agreement with something (Congruent, n.d.)

Crossmodal correspondence
Compatibility effect between attributes or dimensions of a stimulus (i.e., an object or event) in different sensory modalities (be they redundant or not) (Spence, 2011).

Emotion
A strong feeling deriving from one's circumstances, mood, or relationships with others (Emotion, n.d.).

Feeling
An emotional state or reaction (Feeling, n.d.).

Multisensory experience
An experience elicited from the sensory impressions of several modalities (Hultén et al., 2011).

Stimulus
A thing or event that evokes a specific functional reaction in an organ or tissue (Stimulus, n.d.).

Definitions in project

AfH - "Away from home"

Basin room
The part of the washroom area that has washbasins but no toilets.

Business-to-business (B2B)
A relation or situation where one business makes a commercial transaction with another.

Customer/End customer
A company that needs hygiene solutions, i.e. an office building, a restaurant or a university.

Cubicle
A small room surrounded with screens with at least a toilet inside. Located in a basin room.

Distributor
A company that sells Essity's products and other products to end customers.

Main Context
The system border in the project defined by the business, economy and the brand

Natural washroom sound
Sound naturally emitting from the user's activities of carrying out basal needs

Secondary Users
Cleaners and maintenance staff

Service environment
The environment in which the service is produced and consumed

Single Washroom (SWR)
A complete washroom for one person with toilet and washbasin.

Surrounding environment
The environment of the facilities in which the washroom is located defined by volume, flow and accessibility.

User/Visitor
The person using the washroom i.e. the primary User

Washroom
A room with washbasin(s) and cubicles / single washrooms

INTRODUCTION

1. Background

Essity is a leading global hygiene and health company that develops, produces and sells products and solutions within the business areas Personal Care, Consumer Tissue and Professional Hygiene. The sales market covers around 150 countries all over the world and in 90 of these countries Essity is number one or two on the market. The company has more than 48 000 employees around the world with the head office placed in Stockholm.

During 2017, Essity evolved from being a part of the hygiene and forest company SCA. SCA was split in two where the hygiene part of the company got a new name; Essity. Thus, Essity has its roots and heritage from the forest industry in 1929 which is deeply established in the brand. The hygiene expertise started to evolve in 1975 with the acquisition of the Swedish company Mölnlycke.

The company stands behind many big hygiene brands such as the global leading brand TORK and TENA, and regional brands like Libero, Libresse, Lotus, Nosotras, Saba, Tempo, Vinda and Zewa. The business area of personal care consists mainly of baby care, incontinence products, medical solutions and feminine care. In this business area TENA is a leading global brand within incontinence care. Within the business area of Consumer Tissue, Essity is offering toilet paper, napkins, household towels, handkerchiefs, facial tissue and wet wipes. (Essity.com, 2017).

The Professional Hygiene business area targets companies and institutions and has a business-to-business strategy (b2b). Therefore, the products are distributed mainly through distributors and service companies. Tork is the leading global brand within this business area and provide solutions in the areas dining, wiping and cleaning, kitchen and

Fig 1. Some of Essity's wellknown brands.

washroom. These includes complete hygiene solutions, including dispensers, paper towels, toilet paper, hand soap, napkins, hand sanitizers, cleaning and wiping products, sensor technology and service and maintenance. (Essity.com, 2017) It is common that Essity deliver a complete system of products rather than just one dispenser in a washroom since the sales mainly are built on agreements.

Essity has recently launched Tork EasyCube which is a digital cleaning management tool with connected dispensers. This product/service combination facilitates the organisation and structure of the cleaners' work, which also leads to a better experience for the washroom visitors with a high hygiene standard and a decreased risk of toilet paper or soap running out. The benefits from this kind of services in public washrooms has clearly been shown since both customers and washroom visitors gain from this product/service solutions. Thus, Essity wants to investigate these kinds of service solutions further. They have seen a need of communication between the customers and their visitors in the washroom and are interested in what opportunities there are witihin this area. Moreover, the products and services available for this purpose on the market were deemed scarse. Communication solutions and the information society are growing but not specifically in the washroom area. What is used today is either paper sheets or digital screens to show different kinds of information such as advertisement, newsletter or date of most recent cleaning.

Another trend is the growing computing experiences in several fields and environments (Bajarin, 2016). As a visitor, people want to experience something wherever they are and expect this also from washrooms. A good experience could be elicited by good hygiene and a nice-looking washroom, but something more than a good hygiene standard is demanded to elicit extraordinary experiences. Today most companies don't focus much on their washrooms. According to a study from SCA in 2014, one of two people wish their employer would pay more attention to the washrooms (SCA Consumer Study Hygiene Matters 2014, 2014). The need of eliciting an experience in the washroom differs between companies and businesses, but in general the focus on the user experience is a growing trend.

2. Purpose & Aim

The purpose of the study was to investigate how Essity can provide a communication solution from Tork that communicates with and/or to the visitor in public washrooms and elicits a better user experience for the visitor by utilizing new technology.

The aim of the project was to define the visitor and end customer needs, and to create a conceptual solution with guidelines of how to enhance user experience in public washrooms and of how to include customer beneficial communication. Since the objectives of the project was within a new business field for Essity, the project aimed to be exploratory with a visionary mindset.

3. Disposition of report

The report is divided into six sections based on the content. The first three sections cover the background that the reader might want to know to fully understand the result of the development. The introduction describes the background and aim of the project, the Orientation section describe useful information to get a grip of the system and the current situation that affect the development work. The project execution describes how the project has been executed, what methods and tools that have been used and the methodology adjustments that had to be done during the process.

The main part of the executed project is described in the two sections *"PART 1 Needs & Concepts"* and *"PART 2 SoliQube"*. These both include results and analysis based on different steps and areas of development.

"PART 1 Needs & Concepts" covers the results and analysis that led to the functionality of a final concept. It describes the results from benchmark studies and approaches of creating a vision of a sustainable solution that aimed to set a direction for the development work. It also describes the user situation and needs in washrooms today and the customer needs and aspects that affect the customers' needs of communication. The analysis of these insights resulted in a wanted effect which also was the foundation for the following concept development. *"PART 1 Needs & Concepts"* ends with the functions that a solution should provide to reach the effect and thereby the project aim.

"PART 2 SoliQube" describes the development and evaluation of the final concept SoliQube, starting with a description of the user experience it aims to elicit. The description of SoliQube is divided into two parts based on its functionality. The development and evaluation of the impression the concept aims to elicit is thus described separately from

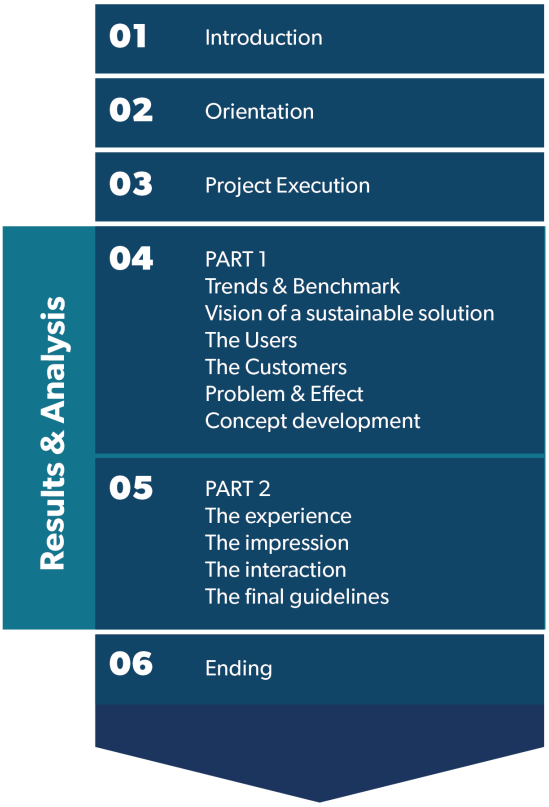


Fig 2. The disposition of the report.

the interaction it enables. The Development chapter in each part contains the reasoning and decision making behind certain attributes related to the function. The Evaluation chapter describes how the design was evaluated through user tests and the results and analysis of these. The last chapter of *"PART 2 SoliQube"*contains the final guidelines of SoliQube.

In the ending of this report, the discussions of all results, conclusions and guidelines on different levels are discussed in a bigger perspective and in relation to each other. Also, the methodology and the impact from the project execution is treated. Finally, the general conclusions from the project is presented.

ORIENTATION

4. The System

The project aimed to create a solution suitable in the washroom environment. This means that the system that was investigated in the project includes all factors that may affect this environment and the products and services related to it. The total system thus includes the washroom environment, the surrounding environment, the main context and the stakeholders of the system (see Fig 3).

4.1. The main context and surrounding environment

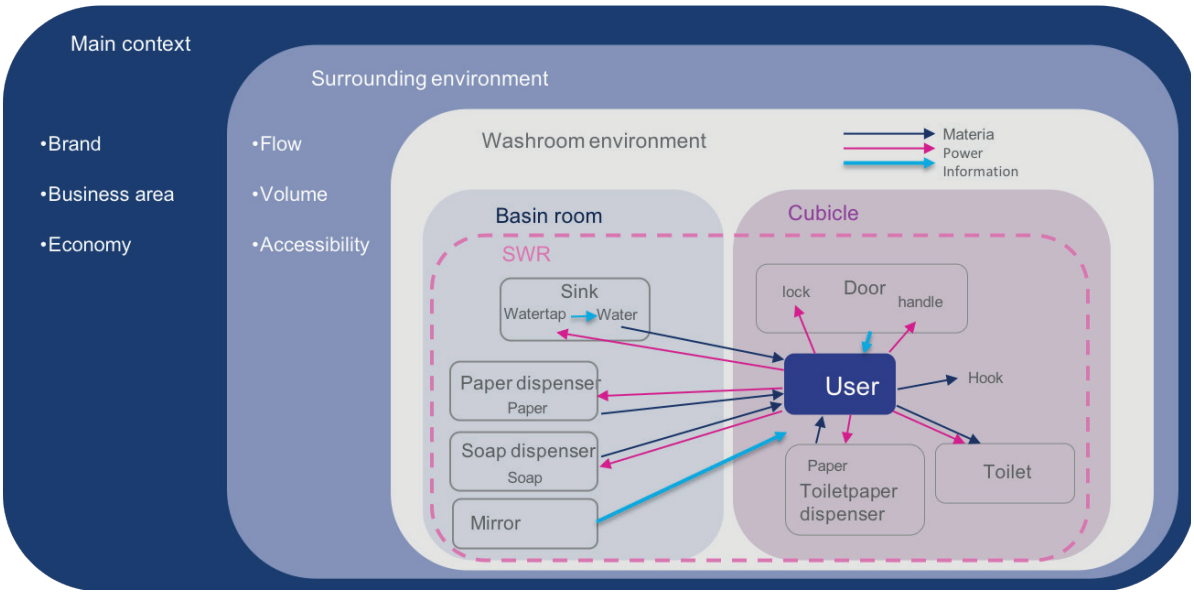
The main context referrs to the total system and is the outer border of the system. The main context is dependent on the company, the business area as well as the company's specific business and brand but also its economical preconditions. The main context is thereby a description of the organisational parameters that affect the surrounding environment and the washroom.

The surrounding environment refers to the physical place of where the washroom is located. This environment can be described by its visitors, the volume, flow and accessibility of people present in the building and the logistics and layout of the building.

4.2. The Washroom Environment

The washroom environment refers to the appearance and functionality of the actual washroom. This can differ depending on the total system described above. However, all public washrooms have similarities due to functionality and the appearance can be categorized into washroom segments.

Fig 3. Illustration of the washroom system.



4.2.1. Washroom functionality and layout

Since the functionality is the main purpose of all washrooms there are similarities in the interior design and planning of washrooms, which often givs them a similar look. The ability to use a toilet and wash the hands sets the system boarders of the room and are the most basal functionalities. Washrooms should be equipped with a toilet, bin mirror, washbasin/sink, hook, soap, hand drying system and dispensers with toilet paper (Svensson, 2008). The system and its components regarded in this project is illustrated in figure 3.

The layout of public washrooms is in this project divided into three different categories with the definitions as follows:

Single Washroom (SWR):

A single washroom is a small washroom with real walls and door for one person use. The SWR could be placed alone in a building or be surrounded by further SWR:s (commonly 2 or 3 in a row). The SWR contains a toilet, basin and sometimes a mirror.

Basin room + single washrooms

This type of washroom has several basins and mirrors inside a basin room, often placed along a wall and with paper towels or hand dryers for drying hands. The washroom is equipped with SWR:s inside the basin room, which means that each toilet inside the washroom is isolated by walls in a separate room. Basins could be placed both in the basin room and inside the SWR or only in one of the places.

Basin room + Cubicles:

Washrooms with cubicles have toilets isolated by thin screens. The screens are shaping "cubicles" which are very small rooms open by the floor and ceiling. There is usually nothing more than a toilet and toilet paper inside the cubicle as the basins are placed outside in the basin room.

The layouts vary in different parts of the world. In the Nordic countries, SWR:s are commonly used in public washrooms, but further south, washrooms with cubicles is the main category in public washrooms (Essity, 2017). The washrooms with cubicles are the most common layout since it is very place and cost efficient, which is what customers generally demand from their washrooms. Public washrooms are often divided by gender even though this is gradually changing in Nordic countries. The division is clear in washrooms with cubicles, where the men's washroom often is equipped with urinal.

Fig 4. Single Washroom

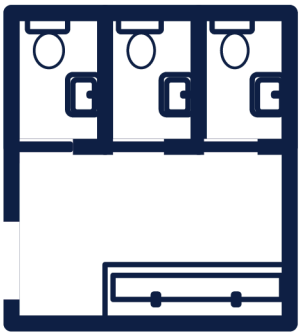


Fig 5. Basin room + Single Washroom

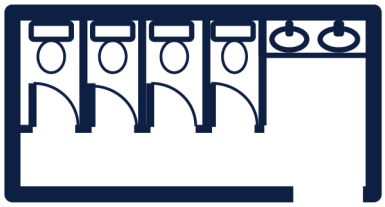


Fig 6. Basin room + Cubicles

4.2.2. Segments and standards

All washrooms usually contain dispensers for paper and soap but the number of products and the sort of product depends on the hygiene standard of the washroom. Essity is dividing the different standards of their customers' washrooms into four washroom segments.

Washroom plus

The most common washroom type is within the Washroom Plus segment. The customers in this segment are companies within several businesses areas, for instance everyday businesses like shops, malls, offices etc. The users are therefore often people coming back on a regular basis, either employees or visitors. However, the users can vary extensively depending on the customer and its clientele, meaning that the users can be children to elderly. The washrooms can be both SWR:s and cubicle washrooms, and what distinguishes Washroom Plus is the focus on high hygiene and good functionality in a professional and efficient way. Washrooms in this segment are taken care of regularly and have a basic, good standard.

Essentials

The second biggest segment is Essentials. The customers are mostly companies within events and entertainment like arenas or fun parks, theatres, concert halls and so on. Common for these businesses and the Essential Washrooms is that there are high volume peaks of visitors and the facilities are not seldom old buildings where the possibility for redesign is limited. Essential Washrooms often have the layout of Washrooms with Cubicles with the washbasins placed in the basin room. Essential Washrooms are used in businesses where facility managers want to maintain as high maintenance and standard as possible but at the lowest price. Businesses with washrooms in the Essentials segment don't prioritize the washrooms more than what's necessary.

Hygiene Critical

The second smallest segment is the Hygiene Critical. The customers are hospitals, medical industry, food industry and similar where the regulations for the business put critical demands on hygiene. The users are thus mostly employees that are aware of the risks of not having hygienic washrooms and will try to keep and maintain high hygiene as much as possible. Since poor hygiene have severe consequences the washrooms are designed for highest possible maintenance and not for show. The washrooms are often containing disinfection-dispensers and touch-free dispensers etc. and the products and surroundings must minimize the risk of contamination and be very easy to clean.

Washroom WOW Factor Style

The smallest segment is the one with the most exclusive washrooms. Customers in this segment are conferences, hotels, restaurants or other businesses with high services and focus on the visitor. The focus is put on experience, communicating values, making an impression and high service standard. The washrooms are cleaned regularly during opening hours and could even be cleaned after every use in some cases. There could for example be particular staff caring for the toilets and the visitors could be provided extra value through luxurious products as perfume etc. There is often more focus on style than functionality in this segment. Most users of these washrooms are visitors which are likely to have very high expectations of the washrooms.

4.3. Washroom Stakeholders

There are several stakeholders that in some sense have an impact on the washroom in a public environment. All stakeholders are presented below and the relations are shown in the Stakeholder Map in Fig 7. Some of them are only involved in the surrounding environment and the building in general whereas some are only involved in the design inside the washroom.

Stakeholders that in a large perspective affect public washrooms and the surrounding environment in the building are:

- Society: legislations, culture and general attitudes of washrooms.
- Sustainability: acceptance for non-sustainable solutions and sustainability demands put on ventilation, water consumption etc.
- Infrastructure: What is possible to produce and import to the specific place, the geographic circumstances, water and energy resources.

Fig 7. Stakeholder map

4.3.1. Professional Hygiene Business - Essity

One kind of stakeholder that affects the washroom functionality and appearance are the companies that develop hygiene solutions for these environments. As mentioned in "1. Background", Essity is a global hygiene company which have a wide range of products within the hygiene business.

Since Essity is a leading global actor on the market with extensive knowledge in the field, the company has great impact on the washroom context. Essity is selling several products under the brand Tork and the hygiene solutions that are sold to public washroom environments are toilet paper, tissue, towels, dispensers, soap, air-fresheners, etc. Since the sales are within business-to-business they mainly sell their solutions and services on agreements, meaning that Essity may have control over all products inside the washroom, from paper to dispensers. In many cases Essity supply the total building with all hygiene solutions, both products and washroom services.

4.3.2. Distributors

Since Tork is a business-to-business brand with disposable products, Essity is using distributors for marketing and selling their products. The distributors are not always but often the intermediator between Essity and the end customers, and the final customer contact is handled by the distributor. The distributor thus affects the communication between Essity and customer.

4.3.3. End Customers

The end customers are the companies that owns the business of the building where the washroom is placed. Almost every business need facilities for visitors or employees and thus also public washrooms. The customers are very different from each other since the size, economy and business area can differ extesively. However, all have the need of hygiene solutions in their washrooms.

4.3.4. Influencers/ Advisors

What products that the end customers decide to use inside their facilities and washrooms are not always a decision totally made by themselves. In many cases a company is renting a building, which means the facility owner has decided on the appearance and functionality. Also, the architects or the interior designers in the building phase have a vision of what is suitable solutions. Sometimes the facility service companies recommend a certain brand or solution to the decision makers so that the service companies know that they will be able to carry out their job properly.

4.3.5. Primary users

The primary users are the visitors of the washroom that will use it, and thus its containing products, for their own need. They are in first-hand visitors to the surrounding environment and thus vary in accordance with the clientele of the main context and the business area. In general, washrooms shall be adjusted to meet the needs of all people that enter the building in which the washroom is located, which means that the primary users can span from young children to elderly people and have varying abilities. However, the primary user is set to encompass visitors that cognitively and physically are capable of using the washroom by themselves. In the report, the primary users are referred to as users or visitors.

4.3.6. Secondary users

The secondary users in public washrooms are persons that use the products or facilities inside the public washroom not for personal purposes but in profession. These are cleaners, employees, maintenance staff and other people. Especially cleaners are important secondary users that put demands on the washroom and its solutions to make it an adequate working place.

5. Theoretical framework

The theoretical framework treats relevant theories for the development work according to human needs, usability, attention, human senses, process plans, as well as methods and tools for the development.

5.1. Human needs hierarchy

To investigate the user needs and satisfy those is key in the product development process. Maslow, an American psychologist, developed during the 40s a theory of how to categorize human needs in a hierarchy of five levels. (Wikberg Nilsson et al., 2015) The theory "Maslow's hierarchy of needs" is often visualised as a pyramid with the most fundamental needs at the bottom and a growing user satisfaction as more levels of needs are satisfied towards the top of the pyramid. (McLeod, 2017). The five levels of needs (from the bottom) are described as:

1. Biological and physiological needs – needs that are crucial for people to be able to function such as air, food, drink, shelter, warmth, sex, sleep, etc.
2. Safety needs – needs that make the user feel safe, e.g. security protection, law, order, stability and with freedom from fear.
3. Love and belongingness needs –needs of being part of a group, friendship, intimacy, trust and acceptance, receiving and giving affection and love.
4. Esteem needs – esteem for oneself and the desire of respect from others (dignity, achievement, mastery, status). To this also cognitive needs and aesthetic needs can be included. (knowledge, understanding, curiosity and beauty, form etc.)
5. Self-actualization needs – realizing personal potential, self-fulfilment, seeking personal growth and peak experiences. (McLeod, 2017).

When the needs of the first level are satisfied, the user will try to satisfy the next level of needs. The user satisfaction thus increases the more needs that are fulfilled. (Wikberg Nilsson et al., 2015)

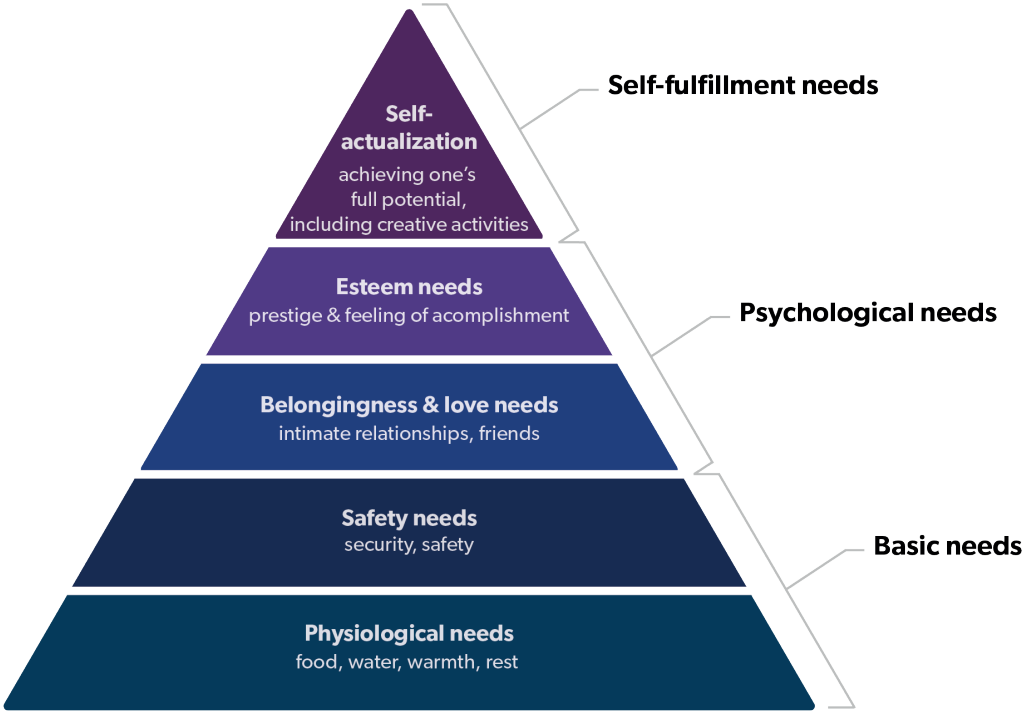


Fig 8. Maslow's hierarchy of needs. Own version of illustration in Simply Psychology (McLeod, 2018).

5.2. Usability

According to the International Standards Organisation (ISO) Usability can be defined as "...the effectiveness, efficiency and satisfaction with which specified users can achieve specified goals in particular environments. "(ISO DIS 9241-11) Effectiveness refers to if the goal of a task is achieved or not, or to what extent it is done. Efficiency is about how fast and convenient the goal can be accomplished and refers to how much effort that is required to reach the goal. Satisfaction is a subjective aspect and refers to the acceptance from the user and how comfortable it is to reach the goal. (Jordan, 1998)

The usability of a product can change quickly dependent on how many times the task has been performed. This is dependent on several components according to Jordan based on the ISO definition:

- Guessability: "The effectiveness, efficiency and satisfaction with which specified users can complete specified tasks with a particular product for the first time."
- Learnability: "The effectiveness, efficiency and satisfaction with which specified users can achieve a competent level of performance on specified tasks with a product, having already completed those tasks once previously."
- Experienced user performance (EUP): "The effectiveness, efficiency and satisfaction with which specified experienced users can achieve specified tasks with a particular product."

5.3. Attention

Attention is a cognitive mechanism where sensory information – salient or behaviourally relevant – is selected for perception and awareness (Desimone and Duncan, 1995, referenced in Shomstein and Yantis, 2004) while other perceivable information is ignored (Attention, 2018). Attention is limited in regards of capacity and duration (Verywell, 2017), and the habituation of sensory information is an automatic process where constant stimuli is noted less in comparison to newsworthy stimuli that stands out (Osvalder, 2012).

As attention is a limited resource it is also selective in what information is attended to (Verywell, 2017). How the mind focuses attention can be described in two orientations, stimulus-driven attention (also "bottom-up" processing) and goal-driven attention (also "top-down" processing). The first is driven by the properties of the objects themselves (Attention, 2018) such as intensity, movement and contrast. Stimuli properties affecting attention are for the visual impression; colour, movement and placement, and for the audial impression; position in room, frequency, volume and content (Osvalder, 2012).

Other external selection factors are (Osvalder, 2012):

- Event frequency, - how often the person is exposed to the sensory information
- News-value, - discovering changes is good
- Personal recognition, - such as hearing your own name in a crowd of people
- The cost of missed events, - if danger is at risk

Some processes involving stimuli such as sudden loud noise or motion, can attract non-volitional and pre-conscious attention. Goal-driven attentional orienting regards a person's motive and interest, where information not deemed valuable is shut out (Attention, 2018). In this, our emotions help us to establish our motivation and preferences about events, objects and people around us, and the main premise is that we pay more attention to emotional information than to neutral information (Asutay, 2014).

Further, cognitive and perceptual mechanisms affect selective attention according to the "cognitive load theory", in which the perceptual mechanism considers a person's ability to perceive or ignore stimuli, task-related or not. If many stimuli are present - especially if task-related - it is much easier to ignore the non-task related stimuli, however if there are few stimuli the mind will also perceive the irrelevant stimuli for the task (Attention, 2018).

5.4. The human senses

The human senses, out of which the most traditionally recognized are vision, audition, olfaction (smell), gustation (taste) and somatosensation (touch), underlie the experiences and behavior of humans. Through the senses the human brain processes different sensory expressions and retrieve information about the world. The processes are both conscious and unconscious (Hultén, 2014, referenced in Möller and Toma, 2017).

Triggers emotional reactions

The information gained through the senses is used to experience the environment, to make sense of it and to react to it in a beneficial way. To present an individual with sensory information can trigger emotional reactions which according to Arnold's book (as cited in Schifferstein and Tanudjaja, 2004) follows from that people experience emotions after appraising whether the stimuli increase or decrease the possibility to satisfy personal concerns, and that this influence how people react to stimuli. When interacting with a product, all sensory modalities are open to receive information, and they provide information about different aspects of the product (where some information may overlap) (Schifferstein and Cleiren, 2005).

Perception of sensory stimuli

The perception through the different sensory modalities vary as their sensory receptors respond to different form of stimulation. Vision responds to electromagnetic radiation, audition responds to vibration of air molecules, somatosensation (touch) responds to temperature changes and mechanical pressure, olfaction responds to volatile substances and gustation to water-soluble substances. Apart from this, the modalities also differ regarding how the sensory information is encoded, linked to other information, stored in memory and retrieved from memory (Schifferstein and Cleiren, 2005).

Vision – the dominant sense

Out of the human's sensory systems, the vision is the most dominant one as the majority of people rely extensively on visible and tangible sensory cues in the environment to create attention for certain objects and products (Hultén, 2013). Schifferstein (2006), reasons that the claim that vision dominates human experience is unlikely to hold for product usage situations as people use their sensory abilities differently if they e.g. drive a car or listen to the radio, and that the importance of vision may fall below the importance of one or more other modalities for individual products. However, vision plays an important part in many product experiences and is according to Schifferstein (2006), virtually an irrelevant part in no product experiences.

Audition – the alarm system

Through sounds, we receive a lot of information about the external environment, making the auditory perception a fundamental part of our interactions and experiences of it. The auditory perception contains detection, analysis and comprehension of sounds and can be either active and attentive or passive and pre-attentive, which is the distinction of listening and hearing (Asutay, 2014). There are three fundamental characteristics of the auditory sensation; timbre, pitch and loudness (Camilleri and Lorenzi, 2016).

The sound perception is immensely influenced by higher-order processes such as attention, motivation and prior experiences. We continuously receive auditory information about our surroundings that we cannot disrupt in a similar way to closing our eyes to visual stimuli. The auditory system receives this stream of information seemingly without much effort, but what it does is scanning our surroundings, detecting and analyzing events and objects, and signaling for attention shifts to the targets of interest. In other words, it functions as an adaptive and cognitive alarm system (Asutay, 2014).

Sounds elicit emotions in the listener and has different affective qualities that depend on their meaning, acoustic and spatial characteristics (Asutay, 2014). Also, Rossling, Moore and Wheeler (as cited in Hultén, 2013) state that humans experience sound highly individually and can react differently to the same stimuli.

Olfaction – the emotional sense

Scent-evoked memories are more emotional than those evoked by cues of other modalities (Herz, 2004; Schifferstein and Tanudjaja, 2004) which implies that the link between perception and emotional experience is

stronger for the olfactory modality than for other modalities (Schifferstein and Tanudjaja, 2004). This effect is due to how the memories are retrieved and not how they are encoded (Schifferstein and Tanudjaja, 2004); scents affect the brain directly and humans react first physiologically and then emotionally or cognitively to scents. For this reason, it is not possible to control how we react to scents and the associative memories retrieved (Samuelsson, 2016). Furthermore, often only a sensation of a previously experienced scent is enough to evoke associations to memories and prior experiences (Hultén et al., 2011).

If a scent is liked or dislikes is an immediate evaluation, and the scent-perception is unique for each individual. According to some researchers, scent-preferences are taught through experiences and are not congenital (Samuelsson, 2016). Lwin and Wijaya (2010) state that it is the cultural differences in experiences that establish how an individual respond to olfactory stimuli.

5.5. User experience

Hassenzahl (2008) define User Experience (UX) in two parts, - what it is, and how it is "made". UX itself is defined as: a momentary, primarily evaluative feeling (good-bad) while interacting with a product or service.

The reasoning behind this is that experience itself is an ongoing reflection on events, - a constant stream of self-talk. When the experience is in relation to interactive products, the events are instances of human-product interaction which have a temporal dimension, - they have a beginning and an end. As a momentary feeling of "good-bad" (in various intensities) always is a part of experience and also regulates our behaviour, it enables qualitative comparison of experiences, which is central in subjective product evaluation (Hassenzahl, 2008).

The second part of the UX definition is as follows: Good UX is the consequence of fulfilling the human needs for autonomy, competency, stimulation (self- oriented), relatedness, and popularity (others-oriented) through interacting with the product or service (i.e., hedonic quality). Pragmatic quality facilitates the potential fulfilment of be-goals. (Hassenzahl, 2008)

Hassenzahl (2008) argue that the fulfilment of basic human needs (referred to as be-goals) is the driver of experience. He poses that people will attach hedonic attributes to a product if they experience fulfilment of be-goals through it, and that in turn, perceived hedonic quality will indicate potential fulfilment of be-goals through interaction with the product. Usability is meaningful if it makes the be-goals easier to pursue, but it is the hedonic quality that directly contributes to the core of positive experience (Hassenzahl, 2008).

5.6. Process and Planning frameworks

5.6.1. ACD3

ACD3 is a framework of an iterative process for product development in seven phases and seven design levels. The phases are: needs identification, use design, overall design, detailed design, construction, production and implementation. Each phase focus on one design level, even though the design levels can be used in several phases. The design levels start on an abstract level going towards a more concrete mindset. The design levels are effect, usage, architecture, interaction, element, manufacturing and imposition.

The purpose of the framework is to keep a structured iterative process to update the design decisions along the way. The phases are executed linearly to push the development forward. Except from iterations of the design levels, ACD3 involves activities in every phase which can be iterated based on need: planning, data collection, analysis, idea generation, synthesis, evaluation and documentation. Planning and documentation are done during all phases and are no necessarily included in the iterations but a parallel activity (Bligård, 2015).

5.6.2. Backcasting

Backcasting from sustainability principles is a methodology applied in planning towards a sustainability transition for sectors of society and business. It constitutes of four steps; the first is the formation of the desirable future of sustainability and its principles formatted from sustainability criteria of nature, economy, well-being and society. These should be first-order principles, - the core principles that give the overall description of the system, to function as guiding principles for different actors (Holmberg and Robèrt, 2000). In the second step the present situation is described in relation to the defined criteria for sustainability, which creates momentum for the third step, where future solutions are envisioned. Lastly strategies are to be found towards realization of the envisioned future solutions of sustainability (Holmberg, 2016).

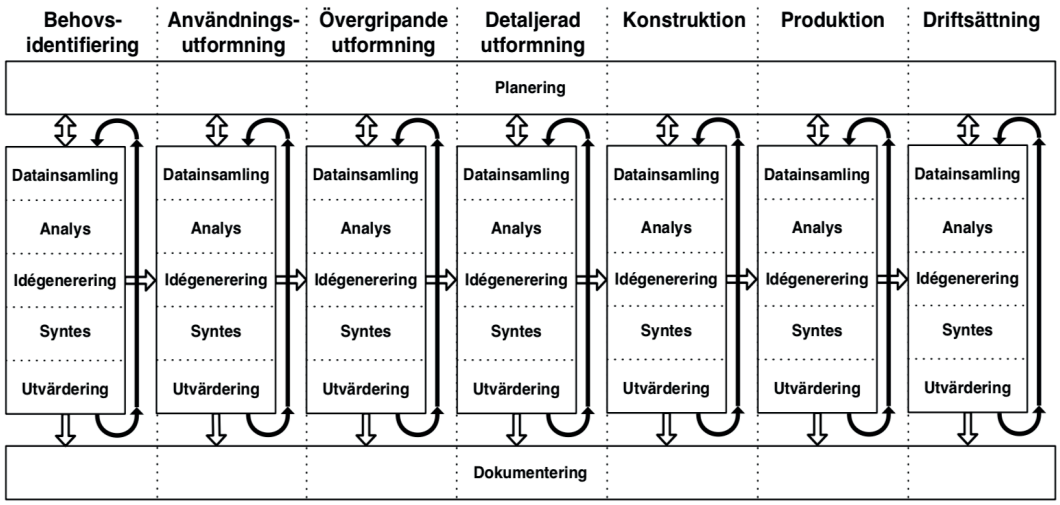


Fig 9. ACD3-process 7 phases (Bligård, 2015).

5.7. Theory about methods

The master thesis has been performed utilizing several methods and tools throughout the process. The methodology and executions are described in *"PROJECT EXECUTION"* but the theory behind these methods are described in this chapter.

5.7.1. Methods for data collection

Observations

An observation is an objective method where one studies a user's behaviour in a real environment or in a situation (Kylén, 2004, referenced in Bohgard et al., 2010). It is used to achieve understanding of the usage and handling of a product/service in life and it enables understanding of the influential variables. To maintain this purpose, it should be avoided to intervene or affect the user´s process during the observation (Bohgard et al., 2010; Boeijen et al., 2016).

Observations can be performed in numerous ways, they are either direct or indirect where the first means that the observer is present to observe, opposed to the latter, where the proceedings instead are recorded with film. Written protocols, check-lists, loose notes or camera-film is used to document direct observations (Bohgard et al., 2010).

The observations are carried out in either real in practice situations or in constructed lab settings dependent on the requested level of detail of the situation or task being studied (the lab setting provides more control of different parameters) (Bligård, 2015). Observations can be systematic or unsystematic; a systematic observation is performed when the observer actively and schematically look for pre-set data of interest, whereas an unsystematic observation is more open and investigative and naturally used in an early study-phase. The results are either qualitative or quantitative (Bohgard et al., 2010).

Observations are suitable in combination with interviews since users might not be aware of their actual behaviour and consequently are unable to - through an interview - reproduce the information gained from the observations (Bohgard et al., 2010; Boeijen et al., 2016).

Interviews

Interviews can be used in many different situations for different purposes (Lantz, 2007 in Bohgard et al., 2010; Boeijen et al., 2016). It is a fundamental method to gather information of what opinions, thoughts, beliefs, motivations, reasoning, behaviours and so forth a person has and thus result in subjective data. The interview can have different forms depending on the intended purpose; it can be structured, semi-structured or unstructured. A structured interview uses predetermined alternatives or univocal questions and is suitable when quantitative data is requested. In an unstructured interview, open and explorative questions are used to gain qualitative data. The structure resembles a discussion and is thus favourable when the interviewer has little prior knowledge about the domain. The semi-structured interview is in between these, it has predetermined topics but a freer structure that allows for probing questions (Bohgard et al., 2010).

Questionnaire

Questionnaires can be compared to a structured interview where the respondents answer to the questions in writing, and is thus a subjective and indirect method. Finding a relevant selection of participants is critical for the method to represent the opinion of the defined target group. Questionnaires are primarily used to effectively gather data from many persons, to gather data from persons who are difficult to reach or to validate previous results from interview studies. The questions could be close-ended or in a scale format (suitable for quantitative analysis) which typically is easier for the respondents to answer, as they will not need to formulate the answers in own words as for open-ended questions (which can bring qualitative analyses) (Bohgard et al., 2010).

Questionnaires can be a suitable method in several phases of a design process; for example, in a preliminary phase to gain information about users, product usage and about opinions on existing products, and for concept testing to gain information about consumer acceptance for one (Boeijen et al., 2016).

5.7.2. Methods for describing users, usage and tasks

Persona

Persona is a method in which a fictitious, concrete and specific representation of the target user is created to serve as a design target in a user-centred design process. Hence, the image is supposed to be memorable, engaging and actionable and to "put a face on the user" (Pruitt and Adlin, 2010). It should describe the users' personal traits, goals, desires and feelings and be represented with a picture together with age and a short narrative (Johannesson et al., 2013).

Hierarchical Task Analysis (HTA)

In an HTA a complex activity's involved tasks and sub-tasks are identified and organized into hierarchical descriptions through a re-description process of the constituent goals of the activity. The purpose of the method is to facilitate understanding of the relationship between task elements and to find all constituent tasks. The presentation of the HTA is favourably done with the means of a diagram. The method can be applied to activities constituting of linearly performed steps as for complex diagnostic tasks (Sandom and Harvey, 2004).

User Journey

A user journey is a scenario represented by a series of steps where the user typically interacts with the product or service that is being designed. The interaction represented could be the current interaction or the desired interaction with the product or service. User journeys are suitable in an early phase of a project and are among others beneficial to understand user behaviour and to identify possible functionality (Mears, 2013).

Story Board

A storyboard is a visually represented narrative about the design in its context of use portrayed in linear sequences. It is a method that convey how the design solution help the users or user groups to reach their goals and it contributes to better understanding of the intended users, context and product use and timing for the practitioner.

The method facilitates discussion and communication with stakeholders since it allows for (literally) pointing at an element of the setting. It shows time and place of the interactions, what actions that occur, how the product is used and how it behaves, and the lifestyle and motivations of the users.

Storyboards can be used throughout a design process and will become more detailed along with it. When used for conceptualizing and evaluating ideas, the storyboards are often rough, sketchy and incomplete in visualization style to invite reactions. They are also open in their form so that different points of view are represented/portrayed (Cooper et al., 2014; Boeijen et al., 2016).

5.7.3. Methods for development:

Brainwriting and Brain drawing

Brainwriting and Brain Drawing are methods used for idea-generation that aim at reaching quality through quantity of ideas. In these methods, all members in a group of normally four to eight people sit by themselves and either write down (Brainwriting) or draw (Brain Drawing) ideas on a piece of paper. When the participants initially generate ideas alone, canalized ideas resulted from idea-generation in a group is avoided. After a pre-set number of minutes the paper is passed to another person to build upon those ideas. Ideas are then either combined or improved or they function as a steppingstone for new ideas. The process can be repeated a determined number of times or until desired amount of generated ideas has been reached (Boeijen et al., 2016; Österlin, 2010).

How-to's

By formulating How-To questions the problem at hand is described in various ways and thus elicit different perspectives on the design problem. This is predominantly helpful at the start of idea generation to stimulate an individual or a group of people to come up with ideas. (Boeijen et al., 2016)

SCAMPER

The SCAMPER method is suitable when already attained initial ideas or concept and when needing new viewpoints to the problem. By applying seven heuristics, one can be triggered to create unexpected ideas or steppingstones to new ones. One of the heuristics is applied to an existing idea at a time. The name

of the method constitutes of the initial letter of the heuristics: Substitute, Combine, Adapt, Modify, Put to another use, Eliminate and Reverse (Boeijen et al., 2016; Österlin, 2010).

Sketches

Computer aided sketching or sketching by hand is a conventional tool to explore and develop ideas; when the sketch is illustrated, the reasoning (about a design problem) is forced to be concretely depicted (Österlin, 2010). Sketching is thus an integral part of the decision-making process (Boeijen et al., 2016) and result in images that can be saved and that are efficient tools for communication with others (Österlin, 2010). They are used in early design stages, during brainstorming sessions and similar, during concept exploration and researching and in presentation (Boeijen et al., 2016).

Models

(Three dimensional) Physical models are vital representations of a design solution, they express, visualise and materialise product ideas and concepts. There are different types of models utilized for different purposes (Boeijen et al., 2016). They can be made in various scales of what they represent, a full-scale "rough" model is called a mock-up and they can further take on a detail, enlargement or overview scale (Österlin, 2010).

Sketch models are fast and convenient models used for idea generation and development. The models are created in an iterative and investigative process to physically explore shape, structure or functions (Boeijen et al., 2016; Österlin, 2010).

Visual Models, Detailed Models and prototypes are used to communicate ideas and concepts (in design teams). A Visual Model ("VISO", also called a dummy mock-up) only has the external visual characteristics of a product idea and is used for presenting that final concept. A Detailed Model shows details of interest and can have some functionality to a limited extent, thus, it has predominantly external characteristics and is used in the concept generation phase. A prototype is a model of real touch and feel that can successfully utilize some of the technical principles.

Functional Models ("FUMOs", also called proof-of-concept prototypes) are used to test and verify ideas and technical principles in the idea generation phase. They are simplifications, but the level of detail and material vary depending on need (Boeijen et al., 2016).

5.7.4. Methods for analysis and evaluation

KJ-analysis

KJ-analysis is a method used to compile and gain an overall picture of collected data. It is based on a "bottom-up" strategy where units of data written on notes are "worked into" groups of themes – the details are studied first transitioning to an analysis of the whole picture. The method is suitable for analysing large amount of data (Bligård, 2015).

PUGH-matrix

The PUGH relative decision matrix is a method to eliminate solutions in an evaluation process. Relative comparisons are made between the alternative concept solutions out of a set of selection criteria based on the product specification. In practice one solution is chosen as the reference, normally an already existing solution, whereupon the concept solutions are graded for each criterion to meet it better than (+), equally as (0), or worse than (-) the reference solution. The net value for each concept solution gives them a ranking. It is possible to use weighted criteria in the matrix where the grades given are multiplied with the weight factors (Johannesson et al., 2013).

Function Analysis

A function analysis can be used to map out the functions/needs that a solution shall provide/satisfy to solve a problem or fulfil the purpose of a solution. Usually the mapped functions are formulated with a verb and a substantive that explains what the solution should manage and not how. The functions can be divided into a main function, sub functions and supportive functions. The main function should cover the purpose of the solution and is built

up by sub-functions. The sub-functions are necessary parts to be able to provide the main function. The supportive functions are not necessary to fulfil but could support the usage or main function and contribute to a better experience. The function analysis and relations between the functions can be described in a list or function tree (Wikberg Nilsson et al., 2015).

Workshop

A workshop with users is a way of having a discussion with users to receive input to an idea. The workshop involves a group of potential users or participants that discuss and reflects on a product solution in terms of usability or function. It can be used as a tool to get input from the participants on the idea where they can come with suggestions and ideas. Workshops are often "hands-on" and let the participants discuss the product through mediating material such as sketches or prototypes (Jordan, 1998).

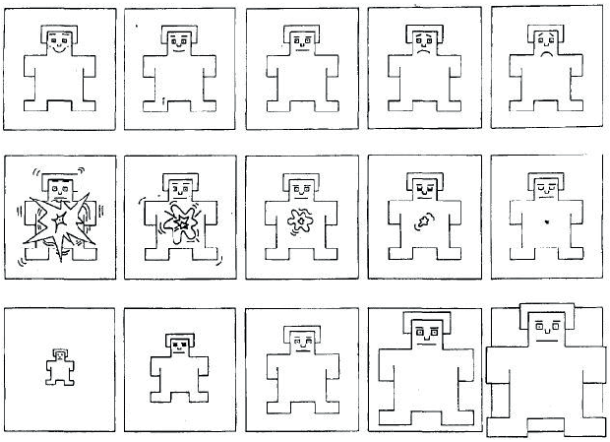
Wizard of OZ prototype

A prototype that to the user appear to be a fully working prototype that is working as I it was manufactured is called a "wizard-of-Oz" prototype. The functionality is steered or manipulated by the investigator or another, often hidden person. The users are thus not aware that the functionality is fake and will react to the usage as if it was a fully working product. These prototypes can be executed in many ways but common is that the users should be able to give response to the functionality that the prototype aims to represent (Jordan, 1998).

SAM

The Self-Assessment Manikin (SAM) is an instrument that assess a person's affective reaction - the pleasure, arousal and dominance elicited in response to an event or object. SAM is either an interactive computer program or a paper-and-pencil version. The latter consists of nonverbal, graphic depictions of the affective dimensions, more particularly, five figures illustrating each dimension in a scale. The subject cross over or in between the figures which result in a nine-point rating scale (Bradley and Lang, 1994).

Fig 10. Paper-and-pencil version of SAM (Bradley and Lang, 1994). Self-Assessment Manikin (SAM) (Bradley and Lang, 1994).



Semantic Differential Scale

The semantic differential scale measures the connotative meaning of concepts, objects and events (Semantic differential, 2018), where the connotative meaning refers to "the associations, overtones, and feel which a concept has, rather than what it refers to explicitly" (Connotative versus denotative meaning, 1998). The scale uses polar adjectives set up at each end, on which the respondent marks his or her position. This derives the attitudes, opinions and values towards the subject of interest (Semantic differential, 2018). There are three major dimensions of meaning that can be used in the semantic differential: strength, value and activity, e.g.; strength: decisive/indecisive; value: cheap/expensive; activity: active/passive (Psc.dss.ucdavis.edu, 2017).

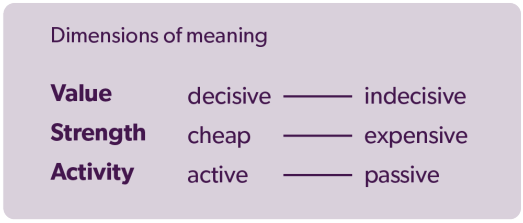


Fig 11. The three major dimensions of meaning (with example) that can be used in semantic differential scale.

PROJECT EXECUTION

6. Process model

The process of the master thesis has mainly followed and been inspired by the ACD3 framework (Bligård, 2015) with some adjustments to fit the project (see Fig 12). As the ACD3 framework jointly regards design work from different levels of abstraction and from different perspectives, it was considered beneficial to use for the project which had a relatively wide project scope. ACD3 had a clear process to follow, it was iterative and covered many dimensions of a development project. It was deemed a good framework to help the development further and remind the authors of important aspects to think about as the project proceeded.

The project process consisted of totally five phases, out of which three were derived from the ACD3 process, being Needs identification, Use design and Overall design. The Needs identification was a central part of the project since the project was of exploratory character with the aim to investigate needs and develop conceptual solutions. Therefore, the process model focused on the early parts of the design process and was adjusted to include these three phases only instead of all seven from ACD3. This also implied that the focus of development was put on the design levels effect, usage and architecture.

The time spent in each phase varied as the phases differed in complexity and as some design levels and activities needed to be iterated further. In total, the master thesis was conducted in the five phases according to the process model in Fig 12. The previously mentioned phases from ACD3 are distributed in phase B-D in the process model. It also includes the start; phase A, and the ending of

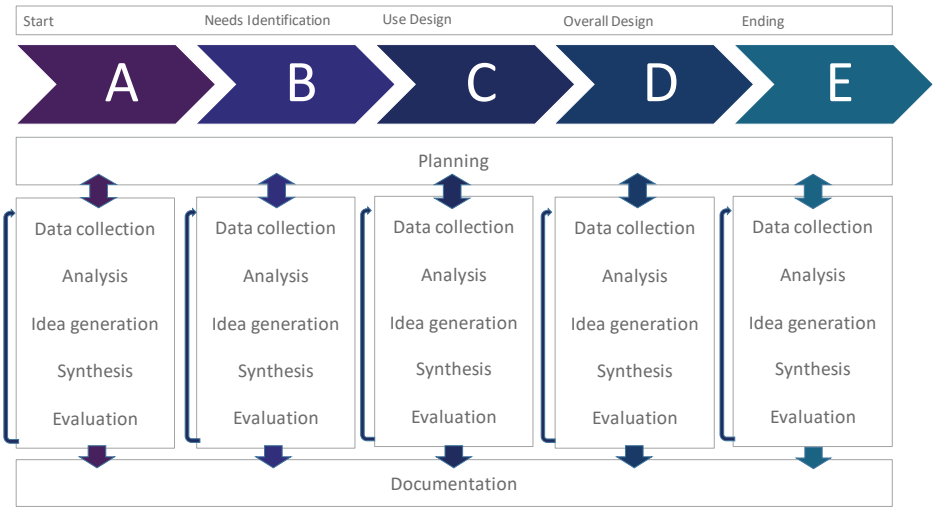


Fig 12. Master thesis process.

the project; part E. In each phase, the seven activities of planning, data collection, analysis, ideation, synthesis, evaluation and documentation were performed to different extents, apart from taking different form. Hence, the model and its activities were used as triggers and inspiration. The aim and deliverables from each phase are as follows.

A. Start

Aim: Perform the overall planning of the project, set the process plan and identify bottlenecks and time-consuming activities. It was also to create a framework for sustainability to set a direction towards a sustainable future and gain a long-term perspective on the development work.

Deliverables: A planning report and criteria for a sustainable solution.

B. Needs Identification

Aim: To identify the effect that the solution shall have on the socio-technical system and identify problem areas based on identified needs of the stakeholders.

Deliverables: A need-specification that the human-machine system aims to fulfil and effect guidelines for the development work.

C. Use Design

Aim: To design the usage based on needs and context, to choose the technical principle of solution and set the frames for the functional design. During this phase, several concepts shall be designed and evaluated.

Deliverables: Decided usage and functionality of a final concept. Requirements of functional aspects in a requirement list and functional guidelines to follow in the overall design.

D. Overall design

Aim: To design the architecture of the solution and choose principle for interaction and aesthetic design by evaluation and testing.

Deliverables: Results from development and evaluated functions. Guidelines of how to create a solution that elicit the wanted effect.

E. Ending

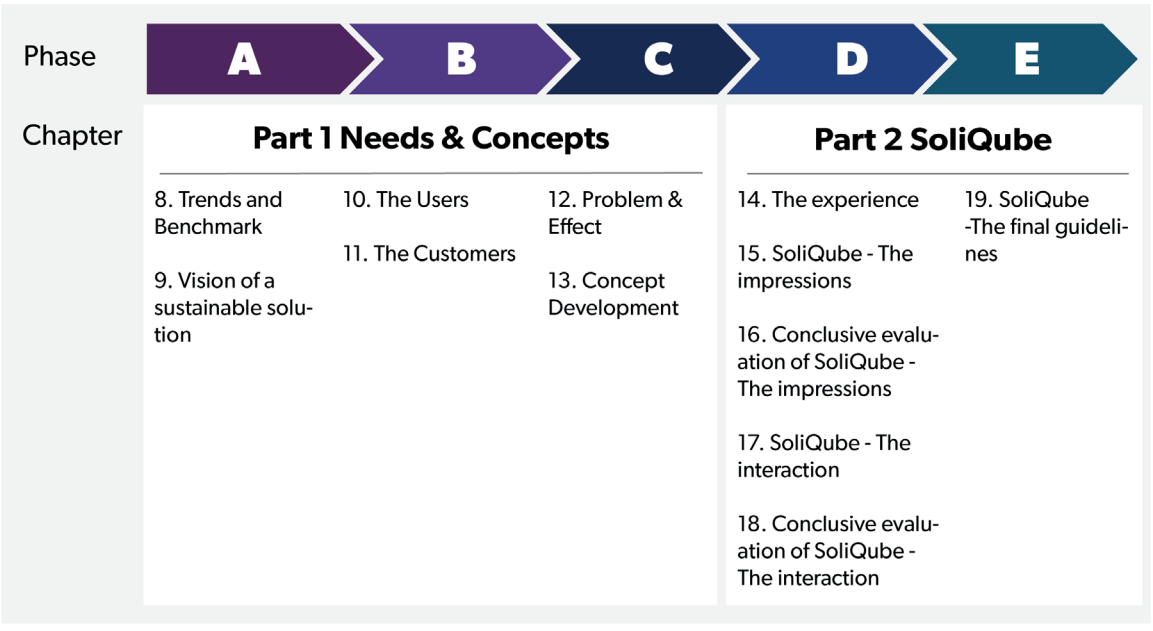
Aim: Visualising and documenting the results to facilitate further development and produce material for presentation and report.

Deliverables: Final master thesis report and presentation.

Report Disposition

The report is structured in two main parts, ”PART 1 Needs & Concepts” and ”PART 2 SoliQube”. The report disposition in relation to the phases in the process is illustrated below.

Fig 13. Report disposition.



7. Phases of Development

The content and specific iterations of activities and design levels varied for each phase. In some phases, all activities in the model were performed whereas other phases focused more on few specific activities. In this chapter, the activities and iterations in each phase will be described more in detail.

The results and analysis from the project execution are described in PART 1 – Needs & Concepts and PART 2 - SoliQube in this master thesis report. In general, the results from each process phase can be read in the chapters as described in figure 13.

7.1. Phase A - Start

The first phase in the project, phase A, regarded planning of the work and setting a framework for development. This implied several of the activities where planning and data collection especially were prioritized in the process' early stage. To create a framework for sustainability, idea generation, analysis and synthesis were included. The activities were performed iteratively both in the development of the framework and the brand analysis.

7.1.1. Planning the project

The planning and the process plan was scheduled with a GANT-chart to get an overview of the allocated time in the thesis. The thesis was carried out parallel to an internship at the company, and the expected extended time until finalisation of the master thesis was difficult to predict. Together with the GANT-chart, a planning report was written to define the project aim and purpose as well as the stakeholders of the project.

7.1.2. Learning about the topic

To aquire knowledge of the topic and the field of the development project, data and information was collected. Firstly, knowledge about Essity and Tork was gained through the company and through access to internal documents. The brands Essity and Tork were investigated with the use of websites and internal documents to receive a better understand about the core values and the sustain ability and brand strategies that might affect the work (see chapter "*9.2. Brand Analysis*"). Except data collection about Essity, Tork and their present products, literature studies were conducted in several other relevant topics such as the human senses and user experience (seen in chapter "*5. Theoretical framework*").

To get more knowledge about communication solutions in washrooms, a benchmark study of current solutions was conducted. Existing products were both investigated on the internet and studied at different sites in Gothenburg city. The result of this benchmark study is described in chapter "*8.1. Existing washroom solutions*"

7.1.3. Framework for a sustainable future

To make sure the project should reach a sustainable solution in the end, this was thought of in an early stage. Parts of the framework "Backcasting from sustainability principles" (Holmberg and Robért, 2000) (see "*5. Theoretical framework*") was used in the start-up phase of the project to set a long-term sustainability perspective early in the project. Thus, only the first two steps of the Backcasting-method were applied in the project.

A sustainability framework was developed to clarify how a solution would affect the sustainability issues of today and tomorrow. Literature studies were conducted on future trends of sustainability, technology and marketing (See chapter "*8. Trends & Benchmark*") and the material was analysed and used to formulate a vision of future needs. This vision made up the sustainability framework (see "*9. Vision of a sustainable solution*") which described a sustainable future with regards to well-being, nature, economy and society.

A brand analysis was further conducted to investigate how the sustainability framework correlated with Essity's brand values, - how the brand could keep its current values yet still keep up with the trends. The analysis was done by studying Essity's mission, vision, core values and sustainability strategies, as well as the business strategies of Tork and what values and expressions they use to communicate their brand. The information was mainly collected from the webpages of Essity.

The synthesis from the sustainability framework and the brand analysis, which can be

read in chapter *"9. Vision of a sustainable solution"*, were reformulated into a visionary framework and visionary guidelines with the purpose to constitute the frames of the development. These were covering sustainability goals that were related to the brands of Essity, Tork and communication and technology solutions, stating what the solution should aim for with regards to society, nature, economy and well-being. The guidelines were used as inspiration in the development process to keep the aim of creating a long-term sustainable solution.

7.2. Phase B - Needs Identification

The Needs Identification phase consisted of data collection of user and customer needs where the data mainly was collected from interviews and then compiled with the use of a KJ analysis (*see "5.7. Theory about methods"*). This procedure was done in two iterations, to collect user needs (result in chapter *"10. The Users"*) followed by customer needs (result in chapter *"11. The Customers"*). The analysed information that had been converted into needs were then synthesized into a core need, a wanted effect and effect-guidelines (chapter *"12. Problem and Effect Definition"*) that later were used in the concept development.

7.2.1. Data Collection of needs

Data of current situations and needs was collected through visitor observations, user interviews and customer interviews. The gathered information from the observations can be read in appendix 2, *Observation notes* and the interview templates are available in appendix 1, *Interview templates*.

Visitor observations

Observations in public washrooms were performed by the authors to receive information of how the visitors act and interact with the washroom and each other in real world situations. The visitors' actual behaviour, for instance where they focused their attention, what they were doing while waiting and how they formed lines was captured in the public parts of the washroom.

The observations were carried out at three different sites; at the cafeteria-washroom at the main library at Chalmers University of Technology, at Svenska Mässan during a flea market event and at the washrooms by the restaurant at IKEA Bäckebol. The locations were chosen based on visitor frequency, on the washrooms' gender division, visitor age distribution and washroom layout.

The observations were unsystematic and direct. Due to the private nature of the washroom environment the observants had to act as users of the washroom not to stand out to the visitors. If not partaking in the system, and thereby display a deviant behaviour, the visitors would become suspicious or disturbed which consequently could cause them to behave different than usual. The design, standard and conditions of the washrooms were systematically noted.

The visitors were observed before and after their visit to the cubicle or SWR, some were only observed either before or after. The observations were performed when the observants stood in line and waited, when listening inside the cubicle, when washing the hands or looking in the mirror in the basin room. Notes were taken outside the washroom after a simulated visit by the observants. This procedure was repeated in rounds to time new visitors that arrived.

A low visitor frequency in the washroom would result in observation inefficiency, but would also make it more difficult to be discrete as the observer didn't blend in. Two different types of layouts were observed; single washrooms not divided by sex (Chalmers Library) and cubicle washrooms divided by sex (IKEA and Svenska Mässan). The visitors spanned from elderly women to children and mothers with babies in the cubicle washrooms. The visitors were majorly young adults, both women and men in the single washrooms.

Interviews with Users

The aim of the user interviews was to gain a deeper understanding of visitors' opinions and thoughts about public washrooms, what affects their experiences and behaviours - what makes a visit to a public washroom a good and bad experience respectively. Seven semi-structured one-hour-long interviews including a short questionnaire were conducted, of which five participants were women and two were men. The interviewees were

acquaintances to the interviewers and were contacted in person with the inquiry to participate. With the risk of the participants being bias due to the acquaintance on one hand, the persons were believed to be open and talk honestly about washroom visits, which is a delicate and private matter. Six of the interviews were conducted either at the interviewers' or the interviewees' homes and one was conducted at a noisy café. An age distribution was preferable but was not considered to be most important for the selection; the ages spanned from 20 to 55.

The recordings of the interviews were transcribed and all responses were then processed according to the KJ-analysis method. The categorized responses were the basis for the formulated user needs found in appendix 3.1, *User needs specification list*. A more detailed description of the interview arrangement and the interview template is available in appendix 1.1, *User interview template*.

Interviews with companies

To achieve an understanding of how companies communicate with their visitors today, what they prioritize regarding their washrooms and what attitude they have towards extending the washroom into a communicative arena, companies within different businesses were contacted via telephone and mail. They either agreed on partaking in a thirty minutes long interview (phone or face-to-face) or to answer a questionnaire distributed via e-mail. This meant that some companies gave more in-depth responses when answering probing questions during the interviews, opposed to the questionnaires.

The interviewed end customers belonged to different business areas so that there would be a spread of visitor contexts and thereby use cases represented. These customers had different visitor volumes and flows which put different demands on the washrooms.

Interviews were not only performed with end customers, meaning the companies responsible of the business in the facilities, but also with a facility management supplier, a real estate company and a communication agency to get input from other relevant stakeholders.

The companies that were interviewed were:

End Customers Friskis & Svettis, SF Bio, GOT event Liseberg, Västsvenska Handelskammaren, Åhlens, NK
Facility Management Supplier Coor
Real Estate Company Chalmers Fastigheter
Communication Agency StyltTrampoli

The interview templates are available in appendix 1.2, *Customer interview templates*.

7.2.2. Analysis and synthesis of needs

The following section describes how the collected data and material was analysed and summarised with tools and methods. The results from the KJ-analysis and Persona is found in the chapters *"10. The Users"* and *"11. The Customers"*, whereas chapter *"12. Problem and Effect Definition"* describes the analysis of how the customer and user needs correlate.

KJ-analysis

To analyse the gathered information from the user and company interviews, KJ-analyses were used. The analyses were executed separately and parallell since the user and company interviews were carried out independently of each other. The questionnaires were compiled and interviews were fully transcribed from recorded audio into written text. All collected data was printed and sorted into several need areas. From the need areas, the material was analysed and transformed into a needs specification list (appendix 3, *Needs specification list*), - one for user needs and one for customer needs.

Personas embodying the user needs

The personas were utilized to concretize the user needs and problem areas found from the user interviews and the observations, and aimed at figuratively represent the different types of needs and usages. The personas were used during a presentation at Essity halfway through the project (see Fig 39) to facilitate discussion of the different concepts' benefits for different types of users.

Mapping out the customers' differences

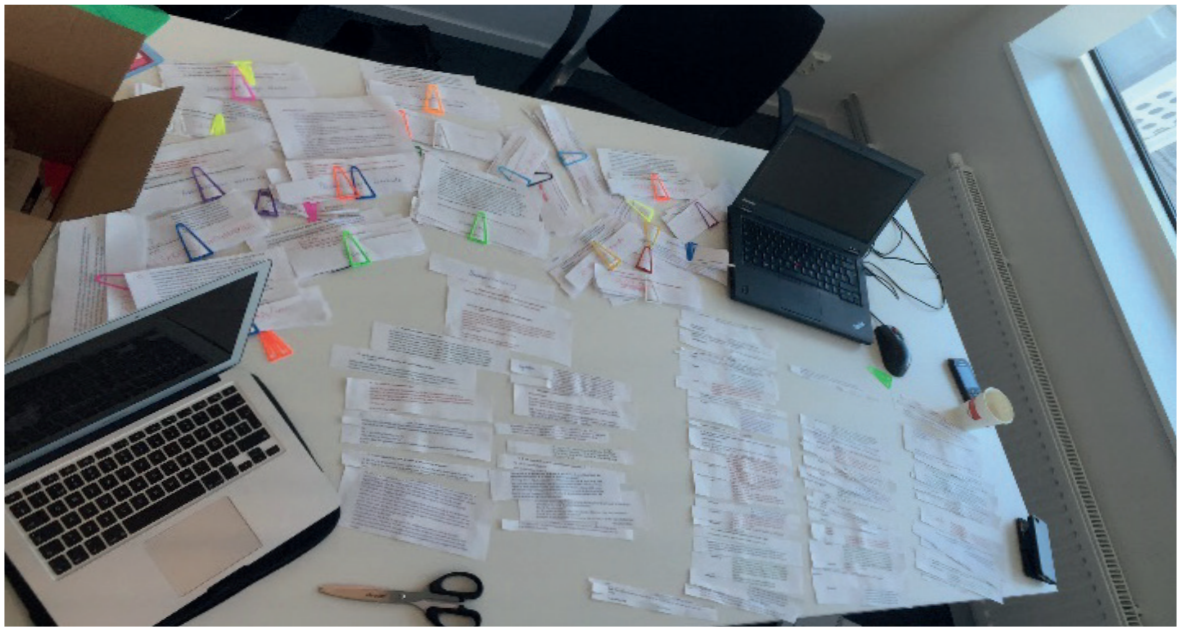
To describe the customers in relation to the washroom standard segments, two segment wheels were created with the four values of economy, hygiene, wow experience and efficiency placed on four axes (see appendix 5, *Customer segment wheel*). In the first wheel, standard washroom segments were placed, and in the second, the interviewed customers were placed to map out what segments the interviewed companies belonged to as well as to verify what needs that might occur in the relevant segments.

To identify how and why the customer needs could differ, several business characteristics were identified based on the needs and on the parameters of the segment wheel. These differences were mapped in a table of business characteristics (see Fig 41 in chapter *"11.1. Business characteristics affecting the needs"*).

Compiling needs into effect-guidelines

From the user needs specification, different problem areas were identified and mapped with a mind-map (appendix 6, *Mind map*). The purpose was to put the user's problem areas in relation to each other and distinguish what problem areas that should be targeted. The identified problem areas were evaluated in a PUGH-matrix (see Fig 47 in chapter *"12.1. Prioritized user need areas"*) to map out which problem areas that had the greatest impact on the user, sustainability aspects and Essity.

Fig 14. The process of carrying out KJ-analyses.



After defining the most important problem area, the needs in the needs specification list were structured in a tree diagram (see method for function analysis), showing how the prime need area for the users could be broken down to sub-needs for both users and customers (appendix 7, *Tree diagram*).

The analysis of needs was conducted in an iterative process where several methods were tested to describe and structure the identified needs. The last iteration resulted in categorization of needs based on the theory of Maslow's Hierarchy of needs (see *"5. Theoretical framework"*). The user needs were categorized in a pyramid of three levels instead of five. The basic needs represented the biological, physiological and the safety needs. The psychological needs referred to love and belongingness, whereas esteem needs and self-fulfilment needs referred to self-actualization needs. The pyramid of needs was adjusted to fit the needs in the washroom context and did not completely follow the hierarchy of Maslow. The customer needs were categorized in two levels: primary and secondary needs, which was based on the principle of hierarchy, but not to all levels, since it was applied onto businesses and companies instead of users.

The desired effect of the project was concluded from the problem areas (*"12.3. Development of desired effect"*) and both user and customer needs were compiled into several effect guidelines that aimed to be useful in further development phases to fulfil the desired effect.

7.3. Phase C - Use Design

In the Use Design phase the needs and effect-guidelines were used as a basis for development. The phase consisted of an analysis of the usage investigated in the Needs Identification phase, followed by concept development in two iterations and finally functionality formation of a final concept. Each of the two iterations included idea generation, synthesis and evaluation. The results from the Use Design phase are mainly presented in chapter *"13. Concept development"*.

7.3.1. Analysis of usage

The focus of the Use Design phase was to investigate and develop the usage of a potential solution. To do so, usage related results discovered in the Needs Identification phase, such as needs and behaviours, were analysed deeper in order to concretize and map the current usage as well as factors that might affect the usage of a new solution. A HTA and a user attention journey, which served as tools during several parts of the development, where utilised for this purpose. The results from the usage analysis can be seen in chapter *"10.1. The user situation"*.

HTA Hierarchy Task analysis

The HTA (see appendix 8, *HTA*) was based on the descriptions of a typical washroom visits made by the interviewees. The HTA mapped out the different activities that take place or might take place in the washroom dependent on different circumstances, and it provided a visual representation of the series of events taking place. It was used in several stages of the concept development to better understand how the concept should interplay with the usage of the washroom.

User Attention Journey

The user attention journey (see Fig 34 in chapter *"10.1.2. Attention during usage"*), which was based on the method user journey (*"5.7. Theory about methods"*), aimed to map out the usage on a contextual level, how it differs from one type of washroom to another. Observations and interviews served as its basis and it mapped out what the visual focus is when visiting a washroom, and how much time the user spends in different locations during the visit. The user attention journey was later used as a tool to identify when the communication should take place, to get an overview of the different stages of the usage and when the users are most receptive to information.

7.3.2. Iteration 1: Eight elementary concepts

The first iteration of concept development was based on the effect-guidelines. Through idea generation and combination of ideas, eight elementary concepts were created that were presented to, and evaluated together with, employees at Essity.

Ideation

The first step of ideation was done with How to- questions (see chapter *"5.7. Theory about methods"*). From the effect-guidelines, the following questions were formulated:

How to

- ... Elicit a private feeling
- ... Feel anonymous
- ... Never be watched or disturbed by others
- ... Communicate to other visitors and cleaners to avoid awkward situations
- ... Not hear or be heard by others
- ... Not be disturbed by or disturb others with odours
- ... Feel at home
- ... Experience and get good hygiene
- ... Elicit extra added value
- ... Communicate information to visitor
- ... Receive information from visitor

Ideation with brainwriting and brain drawing, (see chapter *"5.7. Theory about methods"*) was done around each question for approximately five minutes. The papers circulated and new ideas were added to the old and built on each other (see Fig 15).

Synthesis

After discussions and continuous sketching of thoughts and ideas, the ideas were combined in different ways based on how they would work technically, which effect-guidelines they fulfilled and which context they might be useful in. The aim was to cover as many ideas as possible and to have a wide range of variations of concepts. This step of concept development resulted in eight concepts (for description see chapter *"7.3.2. Iteration 1: Eight elementary concepts"*) that aimed to elicit creative and futuristic ideas and to be as open-minded as possible to keep the variations before the first evaluation .

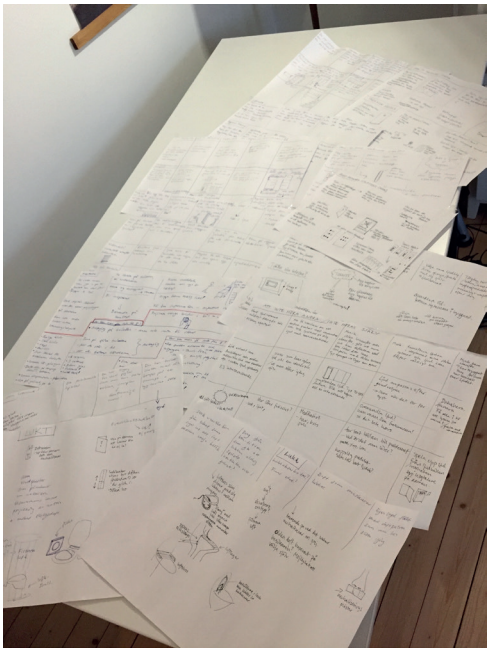


Fig 15. The result of ideation.

Evaluation

The eight elementary concepts were evaluated in a PUGH-matrix based on the areas: user needs, customer needs, personas, suitable contexts, implementation and cost (see appendix 8, *PUGH matrix 8 concepts*). These fields were chosen based on the visioning-guidelines, branding-guidelines and needs specification.

The eight concepts together with the result from the PUGH-matrix were presented at Essity where each auditor got to write down thoughts and opinions on notes which they handed in. A discussion was also held to get as much feedback as possible from the session.

Fig 16. The 8 concepts.

Since the participants were employees, much of the feedback was about implementation possibilities and benefits for Essity. Afterwards, further discussions with the supervisor at Essity was held and some of the concept technologies were investigated to confirm implementation possibilities. Based on this evaluation, four concepts were discarded. The motivation can be read in chapter "*13.1.2. Evaluation of Elementary concepts*".

7.3.3. Iteration 2: Three use design concepts

Four concepts from the first iteration were brought into the second iteration. The second iteration included a usage analysis and an ideation of how to improve the concepts. Three developed use design concepts were then evaluated through workshops and discussions.

Ideation & data collection

To develop the four elementary concepts further the method SCAMPER was used. The method helped to inspire to new functions, implementations and ideas to improve the concepts and find more beneficial approaches. Since the concepts were technical and implied modern technologies, the functionalities were verified through some brief data collection during the development. This was mainly done by searching the web for modern communication solutions, ways of projecting images etc.

Synthesis & usage analysis

The four concepts were analysed from their usage by going through scenarios of the concepts in use. The probable usage scenarios were based on the HTA and the user attention journey, but also on own experiences. In the usage analysis, the impact of the concept's placement in the washroom affected the decision making to reduce the four concepts into three by combining two of them. The motivation behind this is described in chapter "*13.2.1. Ideation and synthesis of Use Design Concepts*". From the scenarios and the usage analysis, new ideas were discovered and the now three concepts were further developed and illustrated by linear storyboards, and further referred to as use design concepts.

Evaluation of use design concepts

The three use design concepts were evaluated in workshops with six potential users. The concept storyboards (see chapter "*13.2.1. Ideation and synthesis of Use Design Concepts*") were printed and shown separately to two participants at a time. While the users watched the storyboard of each concept, the moderator explained the usage scenario after which they were asked to give their opinions about the concepts. In the end, the users were asked to reason about all concepts and rank them in relation to each other. The results from the workshops were discussed within the group and with supervisors. One concept was discarded and the decision was made to combine the most relevant and interesting functions from the two others into the development of the final concept. The results from the evaluation is described in chapter "*13.2.2. Evaluation of Use Design Concepts into new guidelines*".

7.3.4. Function analysis

Fast decisions on what to keep and what to discard from the use design concepts resulted in an overall description of what the final concept should contain and what the usage should be like. The last step of the Use Design phase was to transform the motivations and decisions made in the second iteration to something concrete to bring into development of the final concept.

A function analysis was conducted based on the decided functionality and on the main effect of which the functions should enable fulfilment. From the main effect, a main function was formulated together with supportive and underlying sub functions. The function analysis mapped all functions that a final concept should provide and was the foundation of the requirement specification that was created. The requirements covered the most necessary aspects of a future solution, but to summarise the key functions, function-guidelines of how to reach the effect were formulated. The function analysis and the function-guidelines are described in chapter "*13.3. Functionality of the final concept*".

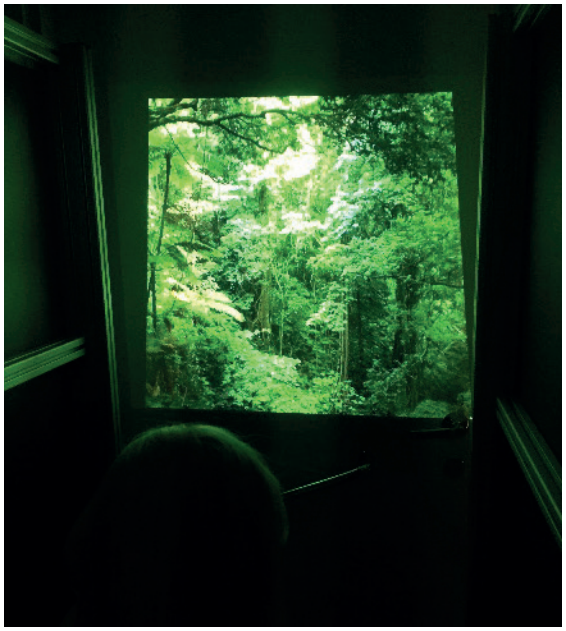


Fig 17. Quick tests with projection.

7.4. Phase D - Overall Design

In the Overall Design phase the functionality and architecture of the final concept was developed and evaluated. Ideation on how the solution should be executed was done through discussions while going through the steps of the HTA, and the resulting final concept was described with a usage map that explained the usage and the user experience that the solution aimed at eliciting. Different executions of specific functions were tested and evaluated to investigate what principles that would need testing and evaluation with real users. User tests were performed at Essity to evaluate the solution's effect on the users.

7.4.1. Usage Map

From the function-guidelines, earlier concepts and the HTA, the functionality of the final concept was mapped out in a usage map to define "when what should happen". The usage map described the steps of usage on a timeline (see appendix 10, *Usage map*). In each step, the contemporary technical functions and user experiences were described. The usage map was thus used to gain a holistic view of the concept and describe the relation between elicited user experiences, functionality and time. The usage map was complemented throughout the development and evaluation of the final concept as soon as new decisions were made. The results from the usage map can partly be seen in chapter "*14. The Experience*".

7.4.2. Quick testing of projection and sound

The final concept was developed up to a point where testing was needed, several quick tests were then conducted to define functional principles that needed to be clear before evaluating the concept with real users. Projected images and sound were tested by the authors to reach conclusions about their execution.

The projection tests investigated image size and placement, lighting conditions, projection surface and image composition. These tests were carried out at the Essity premises and performed inside SWR:s and in quickly built prototypes, representing cubicles and washroom environments of different sizes. The images (Fig 17) show when the authors tested some executions of projection. The

reasoning from these tests are concluded in chapter "*15.1. Development*". The sound tests investigated the authors' own experiences of different ambient sounds, music, and sources of sounds in different kinds of washroom layouts. These tests were performed both in basin rooms and SWR:s at Essity as well as at IKEA Bäckebol in a cubicle washroom.

The tests were complemented with literature studies on the subject, how the users would react in theory. Some of this collected information is written in the Theoretical framework, and some findings are described in the previous mentioned "*15.1. Development*".

7.4.3. Investigation of interactive methods

To get insights of how touch-free interaction can be used to enable feedback, some studies were conducted on the topic. This was primarily done by searching the web for new technologies not yet on the market, and by investigating available solutions in other branches. The authors frequently tested different gestures in sitting positions to experience how it felt and to try to understand what it is like to interact with gestures (Fig 19).

7.4.4. Evaluation through user tests

To gain insights about how the concept would be experienced, its principles needed to be evaluated with real users in a washroom. To do this, different parts om the concept was tested I three separate tests called INFO, THEME and INTERACTION. The INFO and THEME tests both evaluated what impression and experience the user got from added visual material, sound and scent together with the functionality to use a masking sound in the washroom. The INTERACTION test evaluated interaction by hand/arm-gesture control together with the feedback option. The results and analysis from the three tests are described in the section Evaluation in chapter "*15. SoliQube – The impressions*" (THEME and INFO tests) and in chapter "*17. SoliQube – The interaction*" (INTERACTION test).

Fig 18. Development of final concept

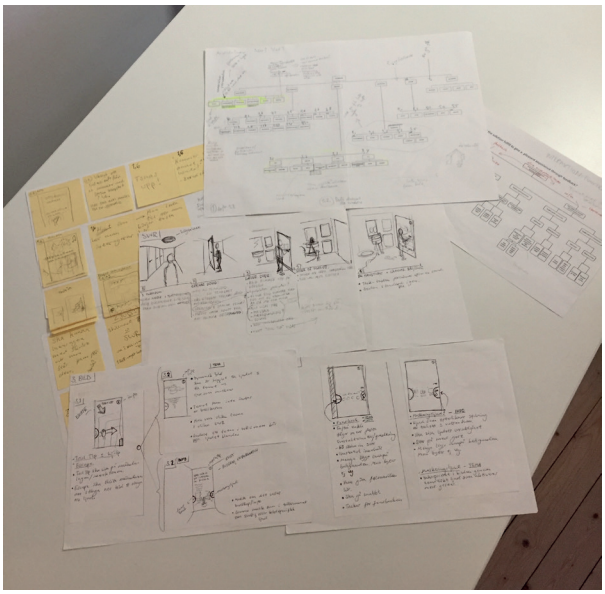


Fig 19. The satisfaction when successfully completing a task with gesture interaction.

7.4.5. Test planning

A test-rig was set up in a SWR at Essity, which were chosen due to its position in the building as well as good practical preconditions for keeping the test-rig for several days without disturbing cleaning and other maintenance. The rig attributes differed dependening on the test, but all utilised a short-range projector mounted in the ceiling. The test participants were Essity-employees that were recruited via the intranet or on site. In total 32 persons participated where 20 were women and 12 were men. The total distribution of participants in the tests can be seen in Fig 20.

It was important that the washroom in which the tests were performed was clean and fresh, had all necessities needed and good products so that those factors would not affect the total experience of the visit.

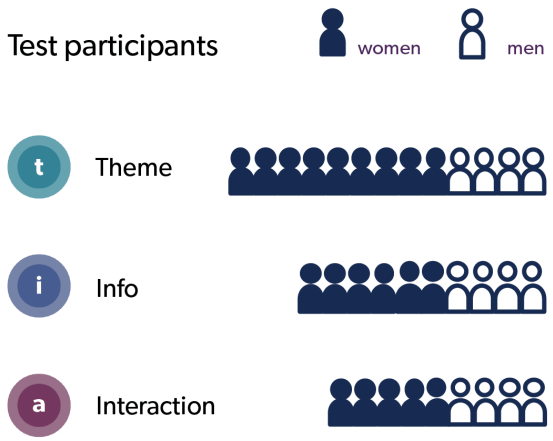


Fig 20. Distribution of test participants; 13 in THEME, 10 in INFO and 9 in interaction test.

7.4.6. Design of INFO and THEME test

In the THEME and INFO tests the aim was to evaluate how the visitors experienced the washroom visit as a whole, what they thought about the containing elements and how they experienced the specific image, sound, masking sound, fragrance and lighting that were used.

Equipment

The test-rigs included a short-range projector with an in-built loudspeaker which was connected to a mobile phone, a fragrance from air-fresheners or essential oil, and thin coloured paper to change the lighting for the THEME execution. A raspberry pie with a motion sensor was connected to a loudspeaker placed on the floor and programmed to elicit a masking sound when receiving a signal (see Fig 22 and Fig 23).

In the INFO execution, a poster from the intranet was projected on the door, music was played from a Spotify playlist in the funk genre and a cherry fragrance was added in the room. The masking sound was a flushing sound.

In the THEME execution, a nature scene video with purging water and bird songs were projected on the door while a pine fragrance was added in the room. The lighting was dimmed and shifted in blue, and the masking sound used was a frog sound.

Both sound and projection were on from the beginning when the participants entered the washroom.

Test Procedure

The procedure was the same for the INFO and THEME tests. The participants got to fill in an initial survey (appendix 13.1, *Initial test survey*) with some background information, then they were asked to go to the washroom and use it as usual or to simulate a normal washroom visit as real as possible. They were asked to test the masking sound during the visit through holding the hand above the sensor placed on the side of the wall. Apart from that they were given no instructions regarding their visit. After their washroom visit they came back to the moderators and got to fill in a SAM (self-assessment manikin) of how they felt during the visit and a semantic differential scale of what impressions they got of the washroom. (See template in appendix 13.4, *Semantic differential scale*). They were asked to talk out loud while doing this so that the moderators could follow their reasoning. The tests ended with a short interview.

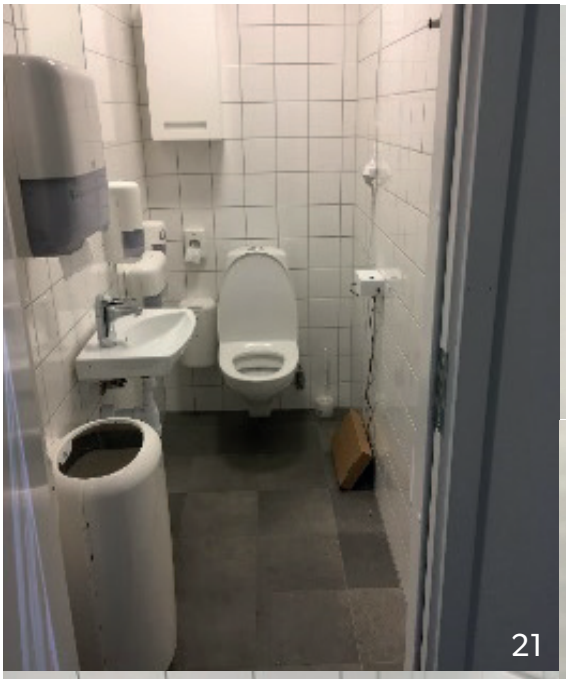


Fig 21. *Test washroom at Essity.*

Fig 22. *Rig of sensor-controlled sound.*

Fig 23. *Rasberry Pie, motion sensor, loudspeaker and boxes.*

Fig 24. *Pine oil, sticks, air freshener and scented candles.*

7.4.7. Design of interaction test

In the interaction test, the aim was to investigate how it was experienced to use gesture control in a washroom, how different types of gestures affects the experience and how it was perceived to give feedback during a washroom visit. For the participants to be able to relate to this, to be able to answer questions and give their opinions, they needed to test the interaction principles themselves.

Equipment

A computer and a mobile phone were plugged into the projector to display three different stripped interface prototypes created in Adobe Illustrator and XD. Screens were put in a large SWR to scale down the room to a standard size and accommodate the moderators during the test (see Fig 25 to Fig 27).

Test Procedure

The procedure started with an initial survey upon which the participant took place on the toilet seat in the washroom. One of the moderators manoeuvred the interfaces on mobile and computer and the other guided the participant through the test scenario, which also was recorded with a camera. The participants got to test three different types of gestures that was explained to them in advance, by which they answered questions through an interface in a "wizard of OZ" style, - meaning that the moderator behind the screen manoeuvred and controlled the interface simultaneously as tracking the participants' gestures in real time. After each type of interaction, they got to grade the comfort of the gestures used. The order of the three types of gestures varied from test to test. In the end of the test a short interview was conducted.

7.4.8. Analysis of test results

The results from the three tests consisted of recorded interviews and surveys along with film from the INTERACTION test. The total result of each test was compiled in Excel documents where all answers, both from surveys and interview questions, were transcribed for each participant (as in Fig 28).

The analysis of the THEME and INFO tests were performed with a KJ analysis to map out different problem areas. The compiled results were then described in new documents upon

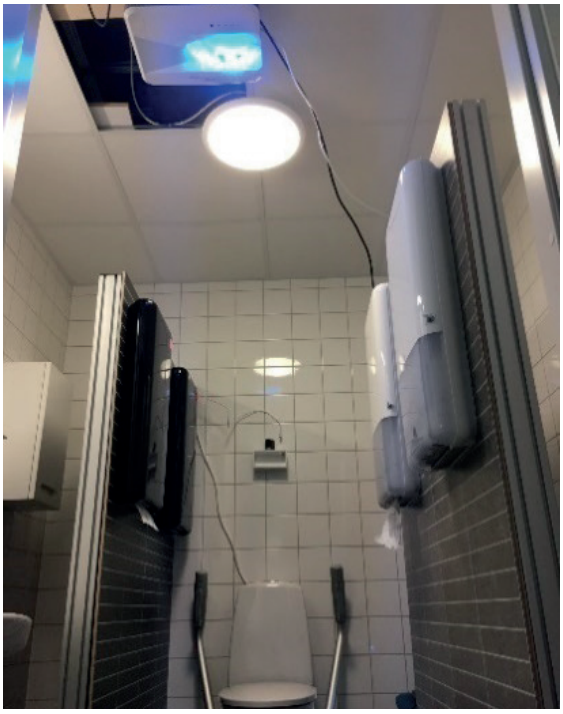


Fig 25. Projector mounted in washroom ceiling.

Fig 26. Wizard of OZ placement.

Fig 27. Screens scaling down the room.

which the results from INFO and THEME were compared (SAM and the semantic scales were compared and visualised through graphic images).

From the INTERACTION tests the interaction procedure, test order and other relevant data for analysis was added to its document. The Excel document was first studied and analysed question by question to find correlations, after which the performance for each person was analysed to discover relations between their experiences and actions. The total analysis resulted in final guidelines which can be seen in chapter *"19. SoliQube – The final guidelines"*

Fig 28. Extraction from the analysis of the INFO and THEME tests.

7.5. Phase E - Ending

The Ending phase was mainly about concretising the results from the different phases and analyse and reflect upon the relations throughout the development. The result from all phases of development was compiled in this report. In the end of the project, the final results were discussed and concluded in relation to previous results and guidelines (see "ENDING").

The final step included the production of this master thesis report and the creation of presentation materials.

PART 1
Needs & Concepts

Part 1 – Needs & Concepts describes the results from the first part of the development, phase A-C. It starts with presenting current trends and benchmark and continues with the set frames for the project from sustainability and brand values. Further, the user and customer needs considering communication and experience in washrooms are described. The chapter also include the concept development, decision making and evaluation performed until

8. Trends & Benchmark

The society affects the products and services in washrooms, and competition from other companies have a large impact on the industry. This chapter presents the result of literature and benchmark studies (For execution see Chapter *"7.1. Phase A - Start"* and *"9.3. Visionary framework and guidelines"*) and describes the current and future situation in washrooms that a solution might adjust to.

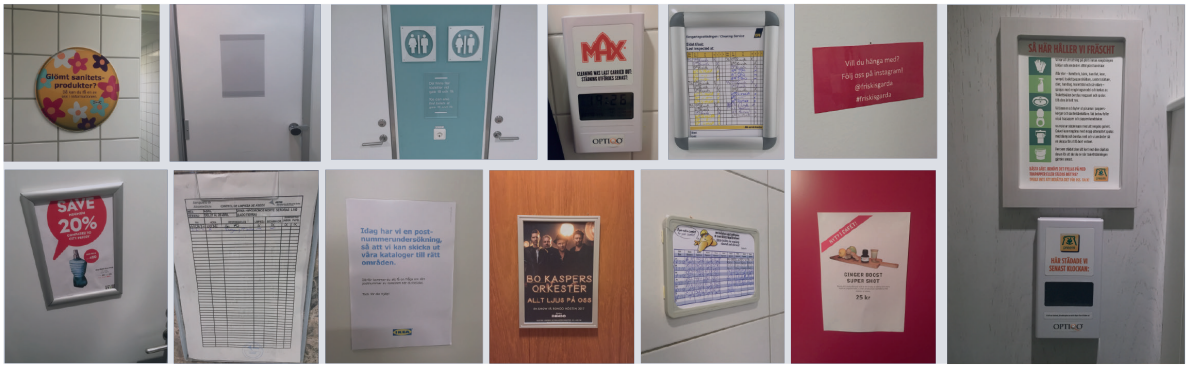
8.1. Existing washroom solutions

A benchmark study was conducted by visiting public places in Gothenburg and wherever the authors would go, alongside searching the web to get information of what solutions that are out on the market. Knowing what customers spend money on today gives an indication of what they might need or think they need. The most common communication solutions that were discovered are presented here.

8.1.1. Showing information

Several washrooms showed information, both in the basin room and in the cubicle/SWR (see Fig 29). Much of the information was practical and informed the visitors of where to find more toilets, cleaning routines and time logs of when it was last cleaned, business internal information such as next upcoming event, or information of how to be more environmentally friendly when using the washroom. The information was in most cases printed on paper and placed in a frame, allowing change of content. When the message was permanent, the construction was more durable and substantial. There were also digital solutions displaying information, but these were often specific products that served to communicate cleaning routines. The placement of the information differed much dependent on the washroom's appearance and standard, but information on the inside of the door of cubi-

Fig 29. Examples of visitor information solutions.



cles or SWR:s were common. If it was placed in the basin room, which was rarer, it could be placed next to the mirrors or next to the door to be read on the way in or out.

8.1.2. Entertainment

Some companies or businesses put more focus on entertaining communication and shows movies or beautiful images etc. The washrooms at Västsvenska Handelskammaren are meant to represent a specific theme by showing short video clips mixed with images and sound in each SWR (see Fig 30). At Danilo, a restaurant in the SF cinema, similar content is shown but in the basin room instead. Using screens to show videos seemed to be a common way of adding entertainment, either integrated in a mirror, put in the floor or just hung on the wall.

8.1.3. Feedback

Feedback solutions were reoccurring in several washrooms and were very alike. The feedback was often given by answering questions with a few alternatives representing a negative-positive scale, such as sad and happy faces (see Fig 30). These solutions were digital and the construction could be a mounted touch-pad or a pillar standing on the floor in the vicinity of the washroom. The feedback solutions were foremost occurring in airports.

8.2. The technology of the future

Today, the modern IT technology is not used to its full potential in the washroom context and as the technology grows, it constantly occurs in new areas. In general, people will live completely differently in 2025 compared to a previous generation. Several aspects, like the technology and welfare development, will increase the possibilities of affecting the life of many individuals (Regeringskansliet, 2014).

8.2.1. Trends of technology

People are more and more getting used to the information-flow in the society. They are constantly aware of, and prepared to receive and riddle among, a lot of different information.

According to the study "Informationssamhället I framtiden" by Regeringskansliet (2008), the traffic on the internet will increase and people will be able to be connected wirelessly 24 hours a day. This will also result in more connected products and services, like the use of internet of things (IoT) and robot technology for services within the IT-area (Regeringskansliet, 2014).

In year 2025, it is probable that most products as food packages, documents, furniture and other, in some way will be connected and possibile to monitor and control, which might have both positive and negative consequences. Robots will also imply a changed society and replace the humans in several fields but

Fig 30. Examples of entertainment and visitor feedback solutions in the washroom. Danilo - 30.1 (Tripadvisor, 2017), 30.5 - Svenska Handelskammaren. 30.1 (Homedit, 2017), 30.2 (Reddit, 2017) and 30.3 (Surveystance, 2018).

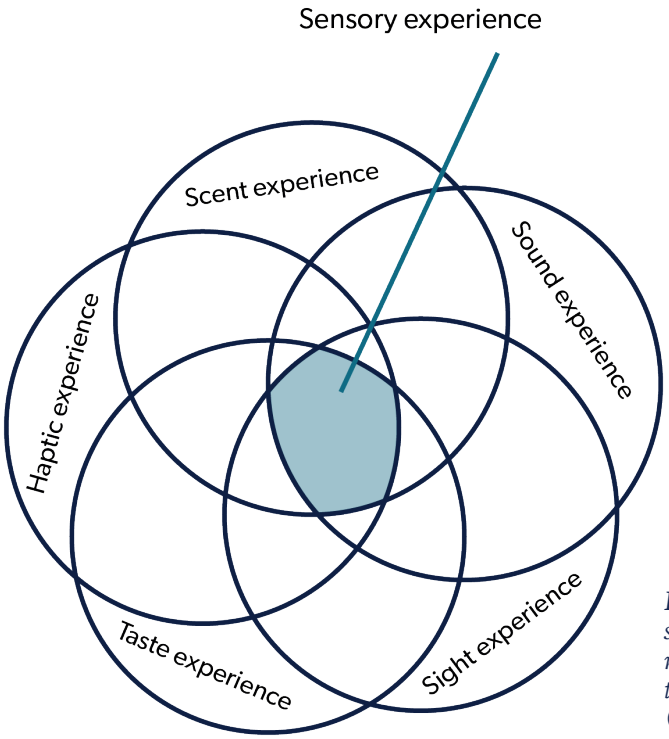


Fig 31. The human's five senses and the sensory experience as described by Hultén, Broweus and Van Dijk (2011) [Translated].

be working more side by side to the humans. The society is not very prepared of these changes and it is unclear how it will be affected by the rapid technology change (Regeringskansliet, 2008).

8.2.2. Integrity

One of the most important factors considering the new technologies is how the society can handle the integrity aspect. With the new technology of sensors, recognition, customisation and similar the society will face challenges with integrity, especially before acclimatisation. In the long run, a surveillance-society will probably be accepted, but it will be a hot topic of debate and it will not change automatically. Knowledge is a very important factor for people to accept new technology and they must be able to trust and understand new complex systems. People will try to keep the private integrity if they don't receive knowledge of how the new world will work (Regeringskansliet, 2008).

8.2.3. Trends of sustainability

Another big trend in the society is the sustainability aspect. Most business models will go towards circular systems, and businesses working with circular economy, recycling and energy efficiency will be obvious. The IT- technology will increase and physical products will be replaced by services as renting in shared economies. One risk is that the energy consumption will increase because more products will demand energy, - information should therefore be spread of how the technology affect sustainability (Regeringskansliet, 2006).

8.3. The future of sensory marketing

There is an ongoing progress in marketing that signifies the start of a new epoch where the human senses are emphasized in a new way. Sensory marketing has its vantage point in the customers' (referred to as "users" in this report) sensory experiences (Hultén et al., 2011) and Hultén (2014, referenced in Möller and Toma, 2017) assumes that experiences will be the most important value-adding factor in the long run.

More and more companies focus on the human senses in their marketing and it is now increasingly essential for most companies to affect the customers in new and innovative ways to stimulate their senses. This progress comes from competitiveness on a tight market and differentiation ambitions in a noise of brands, where companies aspire to – in a more distinct way - express their identity, emotions and values through products/services

and brands (Hultén et al., 2011). Further, the demands on companies to differentiate themselves on the market by eliciting experiences has increased with the customer's transitioning appraisal; from valuing, functional attributes and product advantages to perceiving the product as a sensory experience (ibid).

Hultén, (2011:259) poses that "Academic research has shown that different sensory impressions impact consumer behaviour and perceptions of goods and services". This understanding has become more evident in the service landscape where more places such as stores, destinations, hotels, cafés, restaurants and shopping malls constantly strive to offer sensory experiences to create new emotional connections to the customers (Hultén et al., 2011).

Hultén, Broweus and Van Dijk (2011) argues that Sensory marketing is about establishing a brand image that relates to the customers' identity, lifestyle and personality, - with the use of sensory strategies, but adds that it also is about meeting the customer in the deepest way possible, hence sensational elements are evident to reach an emotional connection with the customer.

Hultén (2014, referenced in Möller and Toma, 2017) mean that the customer's affections, cognitions and behaviour is affected by the interplay between the senses. Recent findings show that multisensory stimulation leads to better memory recall than does unimodal stimulation (Gallace and Spence, 2011). Spence and Gallace (2011) further stresses what is increasingly recognized; that engaging several of a customer's senses in a multi-sensorial congruent manner is important for the development of product appreciation and loyalty.

The sensory experiences an individual has of a brand or a company makes up a brand image in the brain of that individual. Hultén, Broweus and Van Dijk (2011) further explains that how a human interprets and perceives an experience with the five different senses is an individual and personal logic that underlie what they call a multi-sensory brand experience. The final goal with Sensory marketing is to elicit a multi-sensory brand experience encompassing the five senses.

9. Vision of a sustainable solution

To create a sustainable solution that will work in the long perspective, sustainability and branding aspects needs to be considered in an early stage. Since the project was exploratory and aimed to result in a new product concept on a future market with new technologies, a long-term perspective was important to include. The perspective was seeked through developing a sustainability framework and conducting a brand analysis (For method, see chapter "*7.1.3. Framework for a sustainable future*").

9.1. Sustainability framework

A risk with technical solutions is that they might be developed from old needs and problems in old systems, which make them unmodern relatively fast despite modern technology. A solution that solves the needs of today might become outdated and disappear within ten years. The sustainability framework aimed to prevent this and instead enable a solution that can be used in the long term.

Backcasting is a methodology where a vision of a desired future is created, with the purpose of setting a long-term goal, prior to product development. To visualise the future as how it is wanted helps to set demands on what a solution should enable, and how the solution can be developed with respect to sustainability and future aspects. The four fundamental pillars of Backcasting; well-be-

Fig 32. The sustainability framework summarised in a vision board.

ing, nature, economy and society, as well as gained knowledge of trends (*see previous section Trends & Benchmark*) were discussed to formulate a sustainability framework (see appendix 11, *Sustainability framework*) (visualised in Fig 32).

The framework was adjusted to fit the project, which meant that some sustainability aspetcs regarded as too specific were neglected. Energy consumption and material circularity were regarded important sustainability aspects since the solution might be an industrial product. The societal aspects were about the individual's equal rights to education and knowledge as well as individual freedom, - to not be and feel controlled by the system, and was thus also regarded important. However, the area where a washroom related solution was considered to have the largest impact overall was in the well-being category. It was a natural focus for the project given the conceptual solution it ought to end up with, and given the project's aim to enhance the user experience in washrooms.

Well-being is seldom paired with sustainability since the focus often is on climate change, but to increase peoples' well-being in the washroom makes a difference for sustainability. The solution wasn't deemed or predicted to have an impact on society, thus, the strive was for it to be usable and relevant today and in the future.

9.2. Brand Analysis

Most companies have branding strategies for their communication, products and organization which include visions of what they want to achieve (Hestad, 2013). Thus, a new solution must not only follow the sustainability framework, but also the company's branding strategy to be successful. To investigate how a solution in line with the sustainability framework would cohere with the Essity and Tork brands, a brand analysis was conducted.

9.2.1. Essity - the brand

As can be read in the background, the former SCA is a company with a heritage in the forest industry from 1929. Therefore, much of the brand values derives from the SCA brand and the connection to nature and sustainability. However, the hygiene expertise has been an essential part of SCA since 1975 and carries strong brand values as well. From the split, Essity has kept the core values and mainly the values of well-being and hygiene. This is a large focus area for Essity, and as mentioned in the sustainability framework, well-being and therein hygiene are very important aspects of sustainability.

Essity's brand is built on a mission, vision and core values that together shall create a common goal and a shared ambition for employees to strive for. The mission is "To sustainably develop, produce, market and sell value-added hygiene and health products and services." The mission is thus to provide solutions with the focus on health, hygiene and sustainable business models that contributes to a circular society with values both for nature and people. The vision; "Dedicated to improving well-being through leading hygiene

and health solutions" clearly speaks about well-being as a central role of the brand (Essity.com, 2017).

Essity has started a Hygiene Matters initiative which aims to raise awareness among people of how hygiene, health and well-being are connected. Since Essity is one of the leading companies in the fields with a lot of knowledge and expertise, they see it as their duty to spread this knowledge, start discussions and break taboos around the world to improve the well-being also through education (Essity.com, 2017).

Essity's core values are derived and developmed from the SCA heritage. The core values mainly concern how Essity aims to do business and care for their employees, and the aim is that employees shall be inspired by the core values to drive the company forward in the same direction. The first core value is **respect** which is about being honest, open and careful of how actions affect others, both inside and outside the company. The second core value, **excellence**, is about being professional and exceed expectations from consumers and customers. The third value is **responsibility**, which imply that Essity wants to empower their employees to be reliable, confident, creative and accept challenges while performing work carefully with the customers' best in mind (Essity.com, 2017).

9.2.2. Tork – the brand

Tork is a global leading brand within professional hygiene. The brand is thus used for products and services that targets companies and institutions (referred to as customers in this thesis) and covers several product segments in the focus areas; dining, washroom, kitchen, and wiping and cleaning. Independent of focus, Tork claims to "deliver a great experience for the user and a convenient experience for the buyer."

Since Tork is a part of Essity, the brand represents Essity's core values, mission and vision. The focus of Tork is however more on the customer benefits, like economy, efficiency and customer administration, so that the customer shall be able to focus on the main business (Tork.co.uk, 2017). The branding of Tork concerns the relation between Essity and their customers to a grear extent, and even though the products and solutions of Tork follow the values of sustainability, well-being and improved hygiene, Tork solutions are mainly branded as products that increase customer satisfaction through loyalty and efficiency. As written on the Tork website: "We put sustainability to work not only for the planet but also for the benefit of your bottom line, employees and stakeholders." Sustainability values that are connected to Tork are mainly environmental impact on nature from materials and production efficiency. This approach of sustainability somewhat differs from the sustainability values of Essity that focus more on well-being values (Tork.co.uk, 2017).

9.3. Visionary framework and guidelines

The sustainability framework was compared with the brand analysis to see how the framework and Essity's brand vision correlated, which helped to map out the frame of the project. This analysis was formulated into a visionary framework of what a solution should treat and what a future washroom should be like, and moreover resulted in several visionary guidelines to use as inspiration in further work.

9.3.1. Analysis of sustainability framework and brand

The sustainability framework showed that a solution with focus on experience and communication should aim for increasing the user's well-being as the main sustainability goal. This focus on well-being is also in line with the Essity brand.

The solution should be derived from Tork and

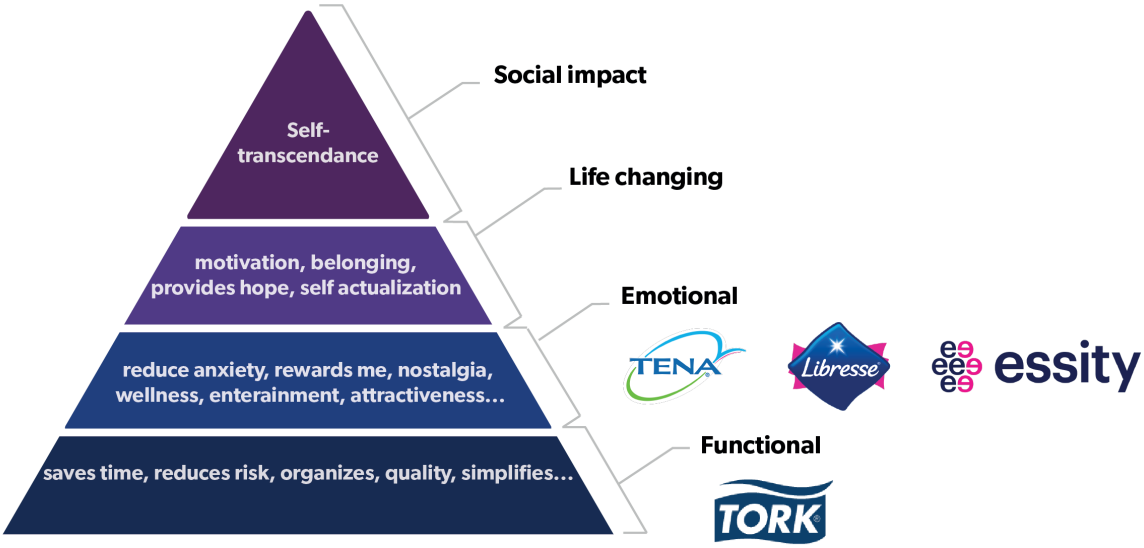


Fig 33. "The elements of value pyramid" (inspired by Almquist, Senior and Bloch, 2016) inserted with Essity brands.

the business area of Professional hygiene. As can be read above, Tork does not highlight the emotional values to the same extent as Essity. By inserting some of Essity's brands in "The elements of Value pyramid" (Almquist, Senior and Bloch, 2016), it is shown in Fig 33 that Essity and brands such as Tena and Libresse are branding themselves more on the emotional level, while Tork is focusing on the functional level. If Tork should present a solution that expressed emotional values it wouldn't be a disadvantage, as long as the solution also clearly shows the connection to other Tork solutions through customer benefits of efficiency and professionalism. To take Tork closer to the end users by providing emotional values could be beneficial in the long run as businesses will be more and more focused on the end users' experiences according to the trends.

9.3.2. Visionary Framework

The Visionary Framework is a summary of the sustainability framework complemented by the brand analysis of Essity and Tork. The framework is a direction for future work, aiming at facilitating creation of a sustainable solution as well as following the brands of Essity and Tork.

The future washroom from societal aspects:

- All people are empowered by having access to education and information about hygiene and how to prevent spreading diseases.
- The society shows trust in the individual, let the individual be free and given the right to make own decisions.
- The individual feel trust in the system but not controlled

The future washroom from Well-being-aspects:

- The washroom should feel safe, be sanitary and not jeopardise one's health
- A washroom visit should not result in the visitor experiencing discomfort, irritation, worry or unease, but lead to increase of one's well-being.
- The user is able to get a pleasant experience through opportunities to customise and adjust the use after need.
- The visitor should able to be optimistic about society taking responsibility for the future

The future washroom according to nature

- The material in the washroom shall be well taken care of and be included in a circular system
- Not use water and energy in a way that could harm biodiversity, eco-systems or exceed the regeneration capacity

The future washroom from economic aspects:

- The washroom shall provide trust and transparency between the stakeholders, (such as information and communication between and to end users).

9.3.3. Visionary guidelines

From the visionary framework, the most important aspects were formulated to visionary guidelines to be used in further work and concept development. These were also included in the requirement list and aimed to be fulfilled by a solution (appendix 4, *Requirement list*).

- The individual should feel trust in the system but not controlled
- The solution should contribute to increased knowledge about hygiene
- The solution should be and feel safe
- The solution should not jeopardise one's health
- The solution should lead to increase of one's well-being.
- The solution should enable user customization
- The solution should give a pleasant use experience
- The solution should inform the visitor of its benefits and effect on sustainability
- The solution should be energy- and water-efficient
- The solution should aim to be a part of a circular system
- The solution should enable transparency and trust between stakeholders.

10. The Users

The users of public washrooms are in this project considered to include all people that can use a toilet. This imply a huge target group and user base with a lot of different needs. This chapter include a wide range of possible user needs and problems which are the results of user interviews and observations. The chapter is describing the analysed results from several data collection methods (See chapter "*5.7.1. Methods for data collection*"). The execution of the analysis is described in chapter "*7.2.2. Analysis and synthesis of needs*".

10.1. The user situation

This chapter describes the user situation in washrooms, meaning how the users behave and why, where they put their attention and their relation to other people in the room.

10.1.1. General Attitudes

The attitudes towards washroom visits to public washrooms are in general very divided according to the interviewees. They had different attitudes depending on the context, standard and state of the washroom. Some said that they were positive about the fact that washrooms existed and that it could be a "heaven" to find one when there was a need. It was emphasized that it could elicit both positive and negative emotions, and that the visit could be either like a break where it is very pleasant to be, or that it could be very gross and make you feel dirty afterwards.

10.1.2. Attention during usage

The usage patterns in the washroom was investigated through observations and interviews and described with a HTA (described in "*5.7. Theory about methods*"). The usage and behaviours depend very much on the users and their needs and can differ a lot, but from the HTA the steps that the users normally go through were identified (see appendix 8, *HTA*). From these steps a user attention journey (Fig 34) was conducted to show where people have their attention in different washroom layouts. It was shown that the users were looking at their phones in the line, talking to a friend or they were focused on partaking in the queue system and payed attention to when the next door would open. Inside the cubicle or SWR the gaze would rest on what's in front of you, which quite often is the door. How long the users payed attention to something in a room varied with the washroom layout. They spend much time inside the SWR if there was no basin room outside, but very short time in a cubicle without basins. However, the attention to a specific object was more related to the action. If the user was washing the hands, the focus was on the hands or mirror, regardless if the user was inside the SWR or in the basin room.

10.1.3. Behaviours concerning Hygiene

The users' behaviours are affected by their personalities and needs. One thing that was affecting the behaviours more than others was the hygiene aspect. All interviewees were conscious about what they touched in the washroom to different degrees. Often, they wanted to touch as little things as possible with as little area/surface as possible and had different strategies to avoid touching mostly handles,

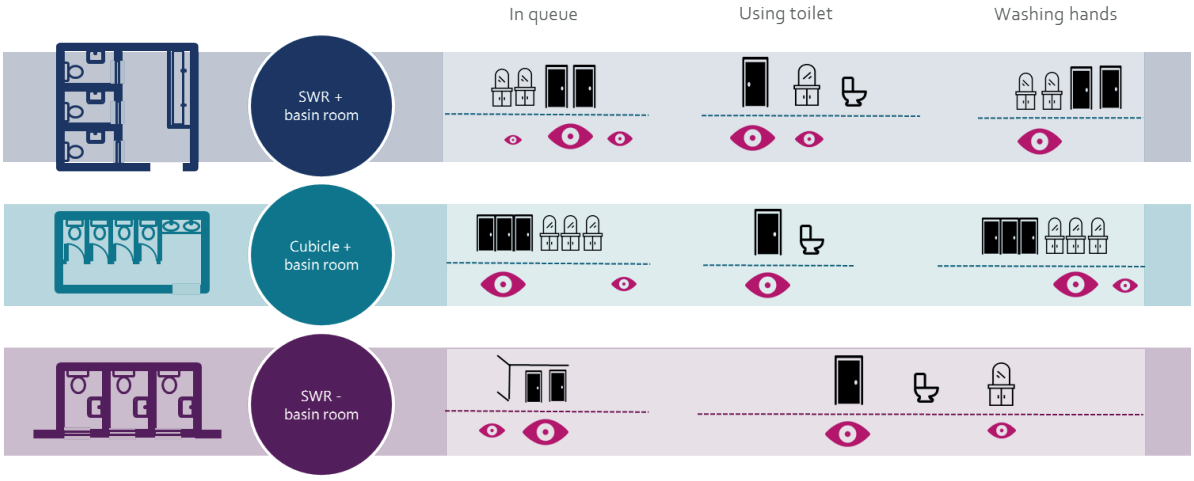


Fig 34. User attention journey in different washroom layouts.

which they knew had a large infection risks.

"What is positive about these cubicles without a basin is that, then you can grab the door and then wash your hands afterwards"

They were the most aware of what they touched after having washed the hands and sensor-controlled products were appreciated for its hygienic benefits. One interviewee pointed out the hygienic deficiency with cubicles or single washroom lacking a basin for women changing their tampons, then it was not possible to wash the hands right before or after the change.

Concern was also expressed about one's belongings touching things in the washroom. Hanging belongings on a hook was experienced as fresher and more hygienic than putting it on a surface (that could have been dirty or splashed on). That there was a hanger in the washroom was important to put up a jacket and a bag, and not being able to do so affected the experience greatly. The interviewees either put their belongings reluctantly on the floor, held them in the hand/kept them on, or put them around the handle if the washroom was lacking a hanger. The subjects handled their mobile phones in different ways and were concerned to different extents about hygiene. Some only put it in their pockets and some could put it on the basin or on a dispenser. One person mentioned that s/he bring out the mobile phone occasionally because it could feel a bit unfresh, another said that s/he used to think that it is disgusting but that s/he does it now.

One interviewee explained that she avoided using the washrooms in "very public" places where many or all people have access to the washrooms because she believed that they would be nasty, and she would feel nervous about getting a disease if using them.

"I walk around for two weeks after and think that I have gotten hepatitis C"

10.1.4. Occupation in SWR or cubicle

All interviewees claimed that they sometimes use their mobile phones during their washroom visits when carrying out their needs except for one who looks at it on the way to and from the washroom. It was common at the workplace where they did not want others at the office to see that they were looking at their phones, or because they were not allowed to use the phone at work. The subjects checked their Facebook, mail, text messages, the news, snapchat or they texted, browsed or played a game or music.

The duration of the visit and how much time they could spare was said to affect if they occupied themselves with the mobile phone or not when being in the washroom. If making a very short visit they did not bother to look at the phone.

For some of the interviewees the washroom visit was also a break, foremost from work, and an opportunity to take a paus and recharge, and some persons therefore took the opportunity to stay longer than needed in the washroom. Most interviewees had their thoughts drifting away during the washroom visit instead of being focused on the present which they stated is the reason why the visit becomes a break.

"Your mind wanders… and that's why it becomes like a break, no matter what you're doing"

When standing in line alone, the subjects described that they either just daydream, look at their phones, look down on the floor or glance at other people while partaking in the queue system. When queueing with someone they often chat with that person.

10.1.5. Interaction with others

The interviewees are generally aware of other visitors in washrooms and what happens around them. To a larger extent in washrooms with cubicles, they are more aware of what others do on their visit, and aware that others notice the same about them due to the poor sound and smell proofing. What the subjects think about this could vary greatly (see "Privacy" and "Hide from others" below). In the basin room, some subjects look at other people when letting the eyes move across the room, sometimes through the mirror. One of the subjects was sensitive just to see and feel the presence of others and experienced it as though she was being watched in the washroom. Another expressed:

"I think that you are quite aware of private space when you're at a public washroom. You have a little bubble around you, and then you don't take eye contact"

The interviewees described that there is normally very little contact between visitors (that they don't know) in a public washroom. It is a space where people are private with what they are doing and that people act accordingly. Eye contact with others is rarely sought unless exchanging polite phrases or communicating specific information, like who's turn it is, if one cubicle has run out of toilet paper or if something is broken. The interviewees wanted the possibility to inform others about this for other people's convenience and to be perceived as a decent person. If others did not do the same, they could get annoyed.

The two male subjects said that they do not take eye contact by a urinal, but that "one stays in one's own zone" and that one looks down, straight ahead or up in the ceiling.

If something remarkable would happen in the washroom the visitors would engage in a conversation, and if being intoxicated among other intoxicated visitors in a club/bar/pub-environment conversation was more likely to be initiated. Interaction with others in the washroom was different with persons that one knows. A conversation normally continued and was transferred to the washroom. Sometimes a social awkwardness could occur when not knowing if one should continue to talk or not in the cubicle.

If there was lots of people waiting in line, the subjects could feel stress about hurrying in the washroom to not make others wait. If knowing that the visit would be fast there was generally less stress than when needing longer time to carry out the needs. The interviewees did not want to be perceived as rude or disturb others by occupying the washroom as they themselves could be annoyed for the same reason. When feeling this stress two of the subjects said that they had problems carrying out their needs.

One of the most frequently mentioned factors however for becoming annoyed and disturbed was if others would not behave respectfully and would make a mess in the washroom. This made the subjects very upset and angry.

10.2. The user needs

The user needs can be divided into three levels based on Maslow's hierarchy of needs (see chapter "*5.1. Human needs hierarchy*"). The basic needs are about safety, functionality and physical basal human needs related to the washroom. The psychological needs refer to user needs in relation to other people such as to feel accepted, belonging, not exposed, etc. The self-fulfilment needs can only be reached when the other levels are satisfied and refers to the need of self-actualization, peak experiences etc. This chapter describes how the levels differ and what needs exist on each level.

10.2.1. Basic needs

All participants had experienced substandard washrooms that made the visit a negative experience. If the washrooms were too nasty to use the subjects would choose another one if possible. If dirty yet acceptable depending on situation, it could happen that the interviewees cleaned before using it. Poor cleaning/contamination, lack of toilet paper, not feeling sure about the locks, not feeling safe with another/other persons in the washroom were fundamental things that made the visit a negative experience. Most interviewees made sure to always check for toilet paper before carrying out their needs.

One interviewee described that s/he, when there were a few people in the washroom, would examine all cubicles before choosing the freshest one. It was found that the visitors would want to see what state the washrooms were in (if being able to choose). Another interviewee described that if the toilet lid on the seat was down, s/he always thought "I hope it looks alright!" because s/he would not want to see any traces because it was unpleasant. One male subject explained that depending on what state the washroom is in he would either sit down or stand up by the toilet. If it looked fresh and the place looked fresh overall, he would sit down, but if it was shabby he would not.

"It becomes like respect for one's surroundings, if it was tidy when you walked in you respect that and you sit down yourself. If it was shabby you don't bother. It gets like that; you leave it in the same condition as it was when you entered"

To be able to wash the hands with water and soap and to get them dry are other basic needs in the washroom that depending on execution could contribute to a better or worse washroom experience. Many of the interviewees mentioned poor usability to cause irritation, foremost when not understanding how something should be used and when experiencing poor functionality.

Fig 35. The basic needs in summary.

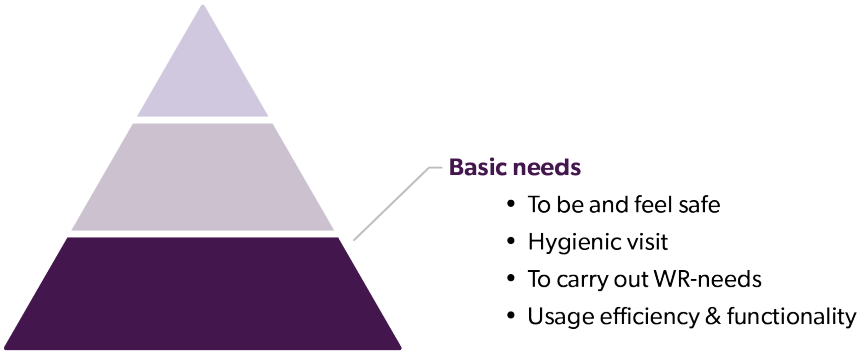
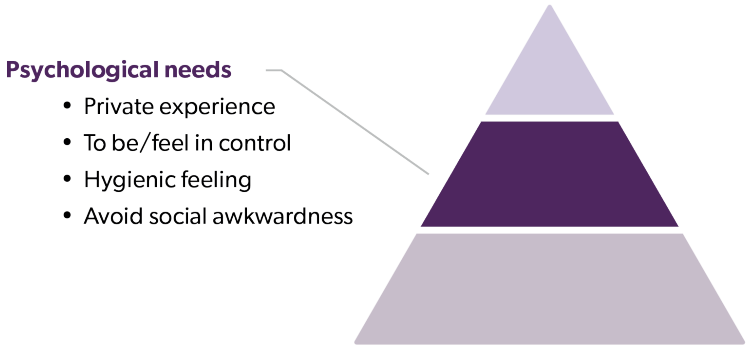


Fig 36. The psychological needs in summary.



10.2.2. Psychological needs

Privacy

An experienced privacy – to be alone/by one self - in the washroom was a factor considered to be very important for a positive washroom experience, and reversibly, to contribute to a negative washroom experience when not feeling private. Naturally when being alone in a washroom the visitor feels more private than when other visitors are present whom s/he needs to relate to. The layout of the washroom was mentioned frequently to affect the experience of privacy, where cubicles were experienced to contribute to an exposed feeling. It was reasoned to elicit a physically exposed feeling since there are thin walls, open at the ceiling and the floor, between you and everything and everyone else. Consequently, the visitors do not feel physically alone, and moreover, all sounds travel in the washroom which was said to contribute to the non-private feeling. One interviewee noted that s/he had avoided to use washrooms with cubicles in favour of looking for a single washroom to get more privacy.

The desired emotion in a washroom visit was also to feel isolated and to have peace and quiet, as expressed by the interviewees. This was said to be met when the room itself felt isolated from the room or area outside through solid soundproofed doors, but the location of the washroom was also said to matter (see Hide for others below).

One interviewee responded the following when asked what had made a visit a good experience:

"It has generally been few people when I have been there. It was also positive that you experienced it as private. It gives you a private feeling, you get like a little isolated. Isolated from the rest of the world. When bringing about the feeling of isolation and privacy it is a good washroom for me. I should be able to do whatever I want in there without anyone noticing. That is a good washroom for me. For me, the washroom visit is something quite private"

The majority of the interviewees wanted to utilize all functionality in the single washroom instead of in the basin room if equal. Six of seven subjects said that they would wash their hands in the single washroom if possible since it is unoccupied, more private, that they do not have to jostle one another, that they take time to look in the mirror at the same time, which they want to do in private, and that it feels nicer from a hygienic perspective for the visitors using the washroom after them. It was expressed that one wants to be all set when leaving the washroom so that one can leave straight away. Only one interviewee preferred to wash the hands in the basin room if it wasn't crowded because s/he wanted others to see it. Two interviewees said that they would not use the mirrors in the basin room if there was a line who could observe them.

The subjects expressed the need to be able to lock themselves in properly to not risk someone opening the door and seeing them carrying out their needs. This was both for one's own privacy and for the convenience of others. Automatic locks were unwanted because the user wanted full control and to be able to

trust the locks. One subject described that he wanted a real handle to twist to feel that he had locked the door properly.

Hide for others, - Embarrassment and Stigma

Some of the interviewees thought that it was inconvenient to "do number two" in the washroom to different extents. It was above all experienced as embarrassing in front of others, meaning that others would know in different ways that they carried out number two in the washroom, and one described the feeling connected to it with "shame". The same person stated that it felt as though it was not completely socially accepted to do number two at the work place, and foremost as a woman.

Different signs of the activity such as sounds and smell and taking long in the washroom caused worry and stress, worry of what others would think and how they would perceive you. Hence, not knowing what other visitors or people perceived about them would also create a worry. One subject described the situation when leaving a washroom with a bad smell as stressful since s/he did not want anyone to perceive him or her as dingy. The same feelings regarded sounds when there was a risk that others would hear it.

The acoustic image in the washroom was said to affect some of the interviewees' behaviour. When it is very quiet and poorly isolated in the washroom, typically in a cubicle washroom, some subjects have troubles relieving themselves and avoid or wait to do so due to feeling bothered about someone hearing.

"It was so embarrassing once, I sat down and I just couldn't pee! There was another girl there (in another cubicle) and it was dead silence and I didn't even dare to move! So finally, I just walked out, yeah it was so embarrassing"

Experiencing anxiety had resulted in a physical impact for some of the subjects who told about occasions where they had ignored to carry out their needs. Having people on the outside waiting for you in a queue or using a washroom where one can hear people that are passing right by was expressed to be stressful by several of the interviewees. The location of the washroom was said to affect the experience of the visit, if the washroom was experienced as exposed some subjects would choose another washroom to carry out number two. If the washroom was visible from the office places one person noted, s/he would wonder if they would think about the fact that s/he had stayed in there for long. Visiting a washroom located at a central spot or right by where people are sitting and working or eating and hence sitting wall to wall with them was expressed as uncomfortable by some interviewees. That they would hear sounds from the washroom or that you yourself would hear sounds from the washroom in such situations was disliked.

Several interviewees said that they actively choose to visit a washroom that is located further away from other people for the sake of privacy even though it means a longer walk, and that they knew that others did the same. This behaviour was more usual when knowing that the visit would last for a while. When choosing a cubicle some of the subjects noted that they based their choice on which cubicle that felt most private and stated that they often choose one far away from the entrance at a corner.

It was also stated embarrassing if someone else would see one's own traces from faeces or period. Accidentally plugging the toilet or not being able to flush the toilet was experienced as embarrassing:

"It's an incredible embarrassment-thing if you cannot flush the toilet. It's really horrible"

One subject said that s/he had cleaned away someone else's traces so that the next person entering would not think that it was him or her that had caused it and left it that way. The subjects that were concerned about what others might think concluded that they want to be and feel anonymous. The need to be anonymous however was different in front of different people.

"So, acoustics and smell affects the convenience a lot for me, with people I don't know or know so-so. With people, you know very well it is like whatever, but the ones you know a little is almost the worst. The ones you don't know at all you don't care about anyways since you won't hang out with them or meet them again. That they know that it is me I

think (is the problem). I mean if someone comes in after me and feel it, but doesn't know that it was me that had been there, it wouldn't matter. So, it has to do with them finding out"

Revealing factors

The natural sounds coming from the washroom visit affect many of the interviewees greatly, it was more common to be disturbed when being heard oneself than by hearing someone else, and it contributed to a negative experience. Some of the interviewees said that they try to cover up natural sounds with other sounds to try and smooth it over. This was done either by putting on music on high volume, flush the toilet, cough or fumble with a dispenser simultaneously as letting natural sounds appear. The person putting on music reasoned that it was preferred that others would believe that s/he listened to music while being in the washroom instead of hearing details of what was going on. One person had troubles hearing all natural sounds from the washroom and preferred if they were drowned out, background music or radio was appreciated in a washroom, and a crowded washroom was preferred so that the sounds became more like background purl than distinct sounds. A crowded and noisy washroom was by some preferred before a very quiet one to drown out one's own sounds. It was also some that tried to control the bowel movements to create as little sounds as possible when there was a risk of others hearing.

"I take for granted that people note what I do. I try to smooth it over and make everything seem as natural as possible. I guess I take it for granted that everyone hears what I do. Partly it is because I might play music or flush when I might break wind or so. I guess I am painfully aware that someone is hearing, so I use different means to create another story about the course of event"

Hygienic feeling – Smell and light

The smell in the washroom has a great impact on the washroom experience and the absence of bad smell or experiencing a nice smell was an important factor for a good visit. To experience bad smell was described as very unpleasant by many of the interviewees. Most the interviewees also felt concern about affecting other visitors by spreading bad smell in the washroom. Three persons said that it was more concerning to bother others with bad smell than experiencing bad smells themselves. Another subject however thought that bad smell was the worst thing about public washrooms to experience. Two persons said that they connected the smell with the feeling of breathing in another person's "poop-particles" and that it felt unhygienic.

Some contexts were avoided since the subjects associated the washrooms there to smell bad, and some washrooms were dismissed due to bad smell, upon which the visitor would go someplace else. One person explained that s/he chose cubicle by how open the doors were, and interpreted that wide-open doors smelled worse because the previous visitor had wanted to air it out.

The lightning affects how things are perceived in the washroom and it can contribute to a better experience of hygiene. People want the light to be bright enough to make them think they can determine the level of hygiene and make them feel safe that it is clean enough. However, it should not be so bright that they see more than they need and get worried about hygiene all in vain.

The interviewees also mentioned the size of the room as a factor with impact on the hygienic feeling. In small cubicles, the feeling that people could have touched the walls and that it should be more contaminated were much bigger than if the interviewees had much space.

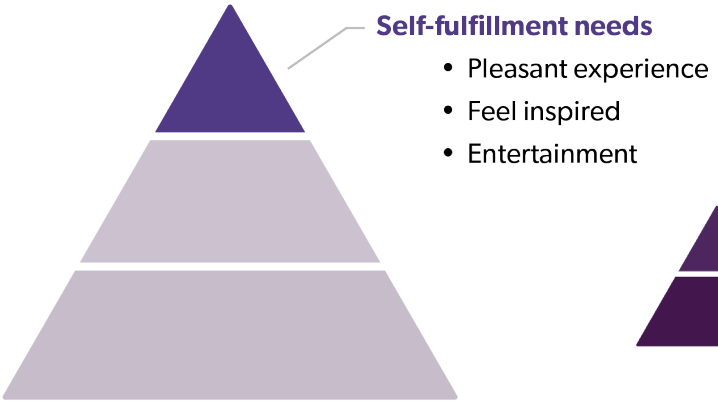


Fig 37. The self-fulfillment needs in summary.

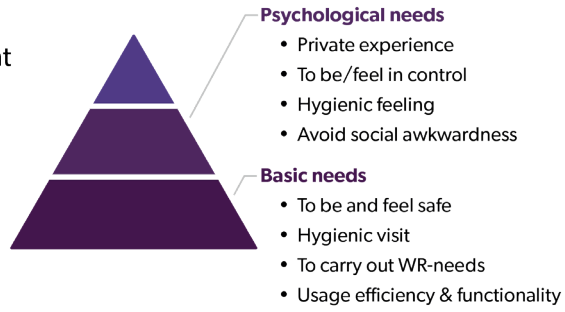


Fig 38. The additional user needs in summary.

10.2.3. Self-fulfillment needs

Coherent impressions

The interviewees had experienced very pleasant washroom visits, which wasn't solely a result of better hygiene, but of a total washroom experience. The interviewees said that positive associations from the impressions that they received in the washroom normally elicited a pleasant experience. Thus, when the washroom had a positive effect on the mood it normally also elicited a pleasant experience, hence, a pleasant visit was posed to correlate with if you would want to spend more time in the washroom or not, - if wanting to linger for a little while it was a good grade. This had much to do with the room itself, the spatial experience, including all equipment and furnishings contributing to the holistic experience. One interviewee explained s/he felt curious to find out if the washroom was well thought through and described one of his/her favourite washrooms as follows:

"They have a nice setting in their washrooms. It is thoughtfully portrayed, and has a clear-intention with the washroom experience. All from the lightning to the interior and decorations, to how the water pours down in the basin. It is very visual and haptic, not the actual toilets, but the holistic experience."

The impressions that were most frequently mentioned as something positive, except from a holistic impression, was a calming and relaxing atmosphere. What colours the intervieees preferred differed from light to dark, but they wanted the holistic experience to also give a calming impression, to help them relax during the visit and take the break that they wanted. One person explained a good experience with:

"It has a very nice interior with diffuser sticks…it felt a bit like a spa washroom."

To get more than the expected

To experience something new, innovative and something more than the expected were appreciated in the washroom. Concept-washrooms in restaurants and similar were often mentioned by the interviewees. The holistic experience of a concept following a theme not only in the washroom was entertaining and made it a pleasant visit. Two of the interviewees said that they enjoyed visiting the washroom in concept-restaurants because they expected the washroom to follow that theme, and that they were curious to find out if the washroom was special.

When fulfilling the curiosity and the desire to become surprised or stunned by the interior and the expressions in the washroom, the total washroom visit could become a good experience eventhough the washroom wouldn't be used for its main purpose. These experiences and emotions were often related to entertainment factors that weren't normally expected in the washroom, such as for music or images.

10.3. Summary with Personas

To concretize the user needs, four personas were created to figuratively represent the different needs and usages that was identified. These are fictitious stereotypes of different realities, all interviewees that we talked to had different ounces of these personas.

Hygienic Hank

... is always worried before a visit because he hopes the WR is clean. He is very troubled to use WR:s that don't feel fresh, but if the need compels him to, - he does everything he can to avoid contamination. He also thinks it's disgusting to hear and smell others' businesses.

Efficient Elsa

... has the attitude that the visit should just be done - she's fast and productive.
There's no fuss with washroom visits, - it's natural and everyone has the same needs. She doesn't like to wait, and if there's a queue she will avoid going if she can.

Private Pamela

... thinks that washroom visits are agonising. She doesn't want anyone to notice what she's doing, and is therefore stressed when there's a line waiting outside. It becomes difficult for her to carry out her needs, so she rather waits instead. She usually chooses a remote WR at work far from others, and tries to hide sound and smell from others.

Dreaming Daniel

... likes to go to the washroom if it's not in a bad condition. It's an opportunity to be by himself and let the thoughts drift away, especially at work, - then he uses it as a break and to relax for a while. After all, he usually hatches good ideas in the washroom.

(Robles, 2017)

Hygienic Hank

- Worries about diseases
- Suspicious to everything unknown
- Hate to touch things
- Hate public washrooms – bad associations
- Can't handle bad smell
- Don't want his things to be contaminated

(Fraser, 2017)

Efficient Elsa

- Want to know where the vacant toilet is
- Very productive
- Want to avoid queues due to time
- Want quick access
- Just do it –attitude
- Thinks it is all natural

(Portra/Getty images, 2017)

Private Pamela

- Ashamed, neurotic, anxious
- Don't want to disturb other people
- Avoid awkward situations, want to fit in
- Problem solver, alone worker
- Need of control. Anonymous
- Never speaks about toilets with anyone
- Embarrassed

(Hoover, 2017)

Dreaming Daniel

- Seeing the visit as a break
- My own time. Chance to think of something else
- Want to be inspired. Walk into a new world
- Trust the standards. Don't want to think about hygiene
- Want to relax, not feel stressed.
- Should be a nice atmosphere
- Likes to be surprised.

Fig 39. The Personas

11. The Customers

In the end, it is up to the end customer what standard they want to set in terms of providing a good washroom experience for their visitors. Thus, the solution must satisfy and appeal to the end customer as well. To be able to create a concept that improves the user experience through communication, it is key that the customer needs are known both in the washroom and communication field, to be able to answer how the customer can benefit from communication in the washroom. Fulfilling the customer needs are essential for Essity since it is the first step to reach the visitor as an end user.

This chapter describes potential customers to Essity within different business areas and describes their current situation and needs. The first section describes how the customers of Essity differs and how business characteristics might affect their needs and demands. This is mainly based on own observations and experiences of different businesses (For method see chapter "*7.1.2. Learning about the topic*"). The second section describes what the customers would like to see on the market, where they see potential to develop the business through the washroom context and what they want to communicate to visitors of their public washrooms. This result and analysis is built on the customer interviews described in chapter "*4.1. The main context and surrounding environment*".

11.1. Business characteristics affecting the needs

Essity provide and sell their products to different customers who all have special environments adjusted for their business. The customers also have different target groups with high variety of users. The differences in the surrounding environment, business and target groups etc. can be regarded as variatons in the main context and are affected by the "business characteristics". These differences result in different customer needs and demands on the washrooms. The result in this chapter is collected from observations and own experiences of different environments.

The first business characteristic is the ***business area.*** This explains what the main purpose of the business is about. If it is a hotel, sports facility or fun park says a lot about the needs put on the facilities and services. The companies that have been interviewed in the project have been divided into seven business areas based on their main purpose and competence (see Fig 41). These have different needs; finer restaurants for example have larger needs of providing a good experience with extra value than a shopping mall and an event based company who focus more on efficiency.

Volumes refers to the number of people that visit the washrooms of a facility during a day. In the areas of All-day-event facilities and Entertaining events, the volume of people visiting the washroom is very high. This is connected to that buildings are large and supposed to serve a large number of people, and that people will spend some time in the building. Examples of companies with high volumes are airports, fairs, concert halls etc. On the contrary, malls might have high volumes of people in the building, but not necessarily high volumes that visit the washrooms. People use the washrooms in malls more seldom since they will spend less time there, or since they will utilize the washroom in a café or restaurant instead. Other public areas where the visitor volumes are relatively low are in restaurants, cafés and bars which often are smaller businesses and smaller facilities.

The ***accessibility*** to the building also affect the customer needs. The customer might prioritize different things for their washroom/s dependent on if the facility is accessible by employees with special access, by paying guests to a business, or by all citizens in a public environment. The difference is that the customers have more or less control of their washroom visitors; who they are and how many they are. The access to the building has an impact on the customer's needs since they must deliver different things dependent of the target group and what the specific visitor requires. Paying guests have higher expectations on the washroom standard than non-paying visitors.

The ***flow*** referres to the number of people that are visiting the washrooms at the same time. Businesses with high volumes need different washroom layouts dependent on if the number of washroom visitors "peaks" at certain moments, which increase the risk of queues, or if the washroom visits will be constant and spread out over time.

Fig 40. The main context and surrounding environment affect the the customer needs.

The ***brand*** affects the customer needs since the customer wants to express it through the environment and be recognized by it. The branding is a big part of the visual appearance and determines how the customers want to display information. Another thing that affects the needs and the environment is the ***economic*** aspect. Companies within the same business area can have varying economical prerequisites which make their demands and needs on their washrooms differ in priority and standard.

The business characteristics affect the contexts and washroom standards. Based on the descriptions of ***washroom segments*** (see chapter *"4.2.2. Segments and standards"*) compared with the business characteristics, every washroom can be categorized into one of the washroom segments Hygiene Critical, Essentials, Washroom Plus and WOW Factor Style. The mapping of the companies compared to the segments can be seen in appendix 5, *Customer segment wheel*.

Business area	All-day-event facilities	Entertaining events	Shopping malls	Restaurants Cafées Bar/Club	Conference Hotels	Training centers	Offices Everyday business
Brand	Svenska Mässan, Liseberg, Swedavia Airports	Got Event, BIO	Åhléns	stylt trampoli	Västsvenska Handelskammaren	Factor Style	COOR, Chalmersfastigheter
Volumes	High	High	Low	Low	Normal	Normal	Normal
Accessibility	Paying guests	Paying guests	Public	Paying guests	Paying guests	Paying guests	Employees
Flow	Constant	Peak	Constant	Constant	Peak	Constant	Constant
WR Segment	Essentials /WR Plus	Essentials	Essentials	WOW Factor Style / WR Plus	WOW Factor Style/WR Plus	Essentials	WR Plus

Fig 41. Above is a summary of the interviewed companies divided by business area. The business characteristics except from economy is described for each business area as well as the washroom segment. The economy characteristic is not marked in the picture.

11.2. Customer needs

The general customer need areas can be divided into primary and secondary needs; the primary needs are fundamental and necessary to make the business running while the secondary needs are about how to develop the business further. Both need areas have underlying needs of communication which are described in this chapter, it covers the current situation and use of communication.

The chapter is based on interviews with one real estate company, a facility management supplier, a communication agency and seven potential end customers within different business areas. The procedure of these interviews can be seen in chapter *"7.2.1. Data Collection of needs"*, and the interview templates are found in appendix 1.2.

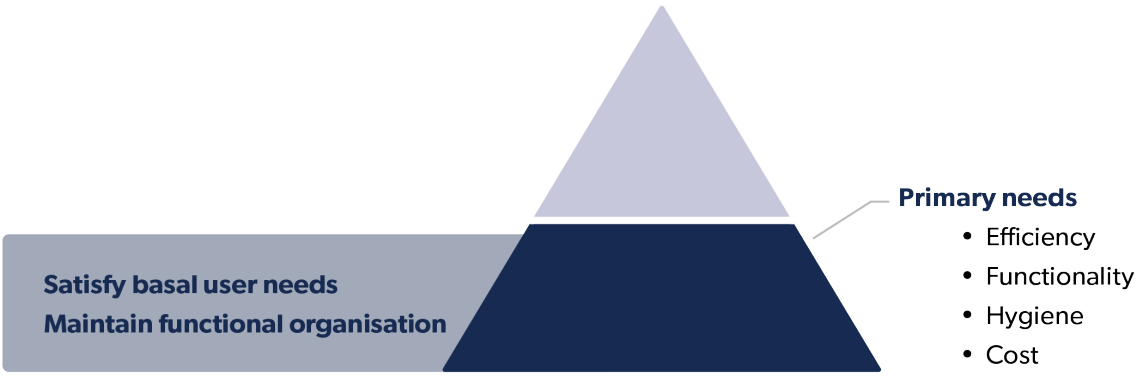


Fig 42. The primary concerns and need areas of the customer.

11.2.1. Primary Needs

The primary needs are the basal needs that the customers will put their focus on. It is to maintain a functional organization and business, with a focus on functionality, durability, efficiency in maintenance and logistics, and to keep the cost down.

It is also, independent on business type, to satisfy the basal needs of the users which means a focus on good hygiene, high maintenance, efficiency and functionality. Thus, the basal user needs correlate with the internal organizational needs, and together they constitute the primary need areas.

Efficiency and Logistics

Efficiency is one of the most important factors for public washrooms, especially for customers with high volumes of visitors or peak flows. Efficiency is important in order to avoid washroom queues which would mean a deficient service standard with the risk of causing a negative user experience.

"It is a problem that everyone visits the washroom at the same time." (Coor)

"They shall allow a high circulation of people, meaning people won't have to que for long" (GOT Event)

Queues will prevent people from visiting the washroom quick and easy, and can in worst cases also prevent other people from moving smoothly in the building. Visitors and personell want to move freely in the building to be able to reach their goals, and if not being able to do so it's likely to affect the overall

experience negatively. The washrooms are usually placed in corners of the building, not always in a place where most people pass by. The customers want to provide available washrooms despite high volume peaks and help their visitors to get to the washrooms as fast as possible. Thus, they need to communicate to their visitors where to find the washrooms and how to move around in the building.

Customers want the visitors to be able to focus on the main purpose of their visit, the reason to why they are there. Visitors will not appreciate to wait in line for the washrooms and spend time on unnessesary things, thus the customer need is to satisfy the users and not force them to spend time on things that they don't appreciate. For this reason, customers are also keen that the visitors are quick and efficient in the washroom to not prevent the flow. Although they would like to create a nice washroom experience for the user, they won't risk that the user stays longer than necessary and make other visitors wait, or that the maintenance possibilities are prevented.

It was clear from the interviews that the companies would like to have control over logistics and efficiency issues. Having control of the number of people in the building and knowing how they moved around was of interest to be able to predict the flows and also plan for a more efficient flow, which in turn could mean avoidance of queues. To have knowledge of visitor behaviours and habits is valuable input when planning the facilities and affect the efficiency and logistics of the facilities. Friskis & Svettis mentioned that many of their visitors change clothes in the washroom and not in the open in the changing room, which meant that the washroom would be occupied for longer than a normal visit, which affected the efficiency of the facilities.

Maintenance and functionality

One customer need is to keep the washroom hygienic and maintain a good standard. A hygienic and well-maintained washroom will satisfy the visitors and is a functional washroom for the business and the staff. It shall be easy for the cleaning staff to make quick cleaning rounds in the washrooms, which is much easier if the standard is kept on a good level. A washroom that is too dirty, quickly escalates and can suddenly be a total mess that will take even more time for the staff to fix. Several interviewees in the user interviews meant they would care less about keeping it clean and tidy if it already had wet floors, paper on the floors etc. Thus, the washrooms need to be functional and practical, and the maintenance must be structured and contain certain cleaning routines to keep it nice despite sudden peak volumes or similar.

"The challenge is that since we have a flow throughout the day, we can't enter all cubicles to clean". (SF)

To secure the visitors of these routines they are sometimes communicated in the washrooms. The customers simply want to tell their visitors that they do what they can even if it suddenly looks badly maintained they shall believe it is an exception.

To provide a functional washroom it should always be equipped with all necessary functionalities such as toilet paper, soap and the ability to dry one's hands. The products in the washroom must be durable and endure the expected usage as well as the demanded cleaning. The equipment shall not break for many years and it ought to be sustainable and energy efficient.

A functional washroom is also an inclusive washroom that is easy to access and use for individuals with varying needs and abilities. The washroom shall be usable for physically impaired visitors as well as parents with children. The users shall also be able to take the time they need in the washroom without feeling stressed, hence the customer should provide several washrooms to enable this. GOT Event said:

"We are prioritizing mostly improvement of the number of ladies and handicap-washrooms since the facilities are old and unmodern."

The demanded washroom functionality depends on the target groups and business characteristics of the customer. At airports, the washrooms are used for taking care of hygiene needs like brushing teeth or doing make-up. This means that the visitors spend a bit more time in the washroom which put other demands on the functionality. If a restaurant/café is serving alcohol, the visitors could be staying for longer and drink more and consequently use the washroom more often which put demands on the maintenance.

The usage, both how often and how much time the visitor spends in the washroom, thus affect its functionality and is of interest to the customer. If users are visiting the washroom very often but not using the toilet each time, many visits don't ncessarily demand more cleaning. A sales manager at an athletic club believed that the majority of visitors make a quick washroom visit before exercising, and that there thus are many visits but that the members are not focused on the experience but rather on getting the business done fast (Friskis & Svettis). It could also be beneficial to know which specific toilets in a washroom that are used the most frequently, it would help to know which toilet that would need more cleaning and maintenance.

Economy

It is necessary for customers to provide washrooms for their visitors but it is nothing they want to spend a lot of money on in general. The need of keeping the cost down was mentioned to be especially important for facility owners. One customer explained that:

"The price is an important factor. The facility owners don't care about the benefits of the usage. One should focus on the architects and get these things in at an early stage" (Coor).

Customers seldom prioritize their washrooms as much as their main business. However, how much money they can afford to spend on their washrooms differs with the business. Businesses with the focus on user experience and a high hygiene standard might put a lot more money and priority into their washrooms than a business with focus on efficiency. Experience-oriented businesses usually put more money on materials and interior, which imply an added cost since they still need to fulfil the efficiency and functionality needs. Even if the washroom is somewhat more prioritized for some companies, there is still a need to keep the cost down as much as possible.

Hygiene

The customers need to provide a high hygiene standard depends on the business, how much they prioritize the washrooms, as well as expectations and requirements from the visitors. At airports visitors have high expectations as they know that travelling people use the washrooms and that it is a place with infection risks, and because of this risks, airports need to keep the washrooms extremely hygienic.

"When we have done rebuildings we have as few touch-points as possible. Meaning there are motion sensors to avoid spreading bacteria and so on." (SF bio)

To be able to keep the wanted hygiene standard, the customer need to have control of who and how many people that are visiting the washrooms. Public places available for all require much more effort to keep on an acceptable hygiene level. If customers feel that there is a risk that the hygiene standard is getting bad sooner than they can handle, it is common that they require an entering fee from the visitor to keep control of the hygiene and standard. Dependent on if the customer has a fee or not, the washroom will keep different hygiene standards. At places with fewer visitors and with limited access, as for offices, the washrooms do not risk becoming unhygienic in the same way.

11.2.2. Secondary Needs

Secondary needs describe the customers´ thoughts and opinions about communication solutions; how it can be used to help the business forward, create extra value for the visitors and deliver something more than the acceptable.

Developing the organization demands a lot from the business and economic strategies, but the focus in this chapter is however on how it can be achieved in close relation to the end user of the washroom. In order to gain more support and grow, companies must reach out to their visitors, get knowledge of them and be competitive on the market. Thus, the customer needs are about following trends, create innovative solutions, a good reputation and extraordinary experiences for the visitors. From the customer interviews, needs connected to achieving this were identified.

Reach out to visitors with a message

The customer interviews showed that the attitude towards communication in washrooms differed; communication solutions inside washrooms seldom occurs today and several interviewees didn't see the reason to why. One person said that they didn't see any specific disadvantages with using communication inside the washroom, but thought that the short time the visitor spend in the washroom was an obstacle for it:

"It is different if the queue system is inside the washroom for a while…there you might want to have a moving image, but our washrooms are not built that way and have the queue outside…"(SF)

The attitude seemed to correlate with the functional aspect; how the washrooms are designed and the time the visitors could be exposed to the information. Another interviewee claimed that the limited number of washrooms in their facilities makes the area unprioritized for communication. S/he feels that other areas in the building are far more interesting and more probable to reach their visitor. Some had the opinion that it is not suitable to communicate things in the washrooms due to the environment. To communicate advertisements about food and other things that you are supposed to be tempted by will have the opposite effect in association with washrooms.

Despite the low use of communication in washrooms today, some companies saw potential in using it further on. Both because it is a place where a lot of people might go, and because it is a place where people will be able to focus on the communicated message as the environment in general is calm where people aren't already exposed to a lot of information.

What information?

One important distinction that affects if it is suitable to communicate something inside a washroom is of course what information the customer wants to communicate. From the interviews, three areas of information were identified that the customers want to communicate; local practical inforamtion, advertisements/commercials and business-related information.

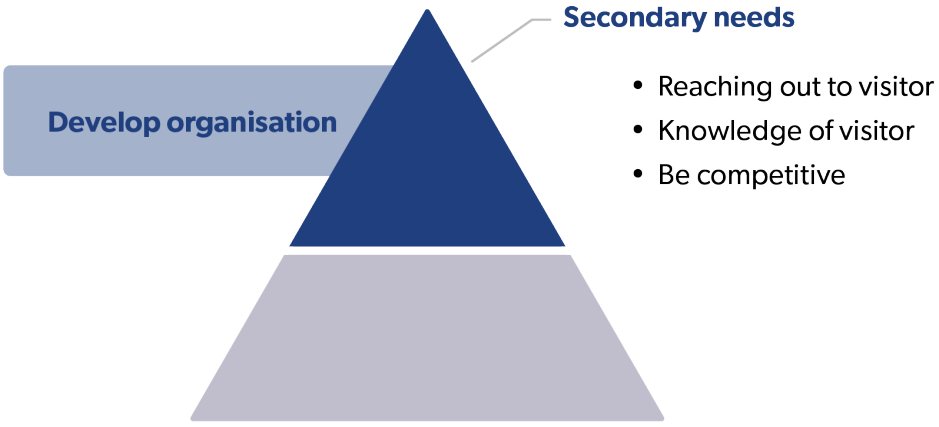


Fig 43. The secondary need areas and concerns of the customer.

Local practical info

One prominent area of information is the local practical information that the customer wants to communicate to their visitors. This is information that facilitates the visit in the building, such as maps of where to find different things, opening hours, instructions of how to use something or how to behave and move in an efficient way. This is done mainly through screens and billing, both digital and analog. One example of this type of communication that is used in washrooms today is (as mentioned in the benchmark studies) to give information about cleaning routines from the specific washroom. One interviewee previously had this kind of system but wasn't satisfied:

"We have had that, not a digital display but a paper sheet where you note when it was last cleaned"…"what turned up was that it could create bad will for the visitor cause let's say you've cleaned the washroom and someone makes it untidy within 15 minutes"…"then you almost need someone that maintains the standard that you actually want to signal after the control. But I think it is a great thought to communicate to the visitor that we maintain the washrooms." (SF)

The purpose of these cleanings routines is to inform the visitor of how clean it is. However, this is not enough to satisfy the visitor if it doesn't look well maintained.

Advertisements

It was clear that communicating advertisements is not something customers are eager to do, it is more considered to be something they might need as a source of income. However, if they need to use ads, they want them to be suitable and related to their business:

"We could have some kind of ads, if it is a co-worker…that fits our values and so on, of economic reasons actually." (Friskis & Svettis)

According to an architect consultancy, communicating big logos of known brands is not fashionable:

"We've all seen the kiosk where the Coke symbol is bigger than the name of the kiosk. Then it is bought up. It's Coca-Cola that has payed for the symbol. You lose integrity in what you sign up for." (Stylt)

Nowadays the focus is more to integrate products in a suitable business and service, and since washrooms are not the main business for most customers, it might be difficult to communicate an external brand or product in a smooth manner to both fit the main business and the washroom context.

Business related information

Customers also want to reach out with business related information, which can be both internal and external dependent on the context. This imply information of business events, news, services, history and info about the brand. This can also be more indirect information to communicate the brand by showing values of how to live more sustainable etc. One problem is to communicate relevant business information to the right people. The interviewed athletics club said that they sometimes communicate the same information in all communication channels even if they know only a few will be interested.

"You don't care about what is happening on the other side of town, you want information based on your training behaviours and your interests. So, it has to turn around now, to talking about right things with the right people." (Friskis & Svettis)

Where to give a message?

Where is best to communicate what information? This connects to the issue of communicating information through different channels. Nowadays, digital communication channels are getting more common and are used for several purposes. Most companies are using websites, social media or news letters to reach the upcoming visitors with useful information. Websites are used to give information to the mass and as a tool to guide visitors to find specific information. Social media is used for marketing reasons, getting feedback and reach out to new users, often with general messages that is interesting for a lot of potential visitors. Problems with social media is that it is easy to use as a communication channel to send out a lot of information, and that it is a risk that it is more used for one-way communication than something that is creating a discussion. If it works as it should though, it can have a great spreading effect. For visitors that are customers already, e-mails and news letters are more useful since much more specific information can reach the users. To communicate a feeling of good services, the information is preferably delivered

by personal contact. Many companies prefer staff visible and available to provide very quick information and answers on questions. That is also about making the information more personal to fit the need of their visitors.

"It's our goal that you are met by a person and not just written information" (SF)

In some situations, this flexible way of communication is required. Personal contact is used to communicate very different information. It can be both to explain to people where there are less queues as well as give very specific information to one guest.

Some information need to reach the visitor when they are walking around in the building and need to be received at the site. To enable communication in public buildings, floor and wall surfaces are used as information areas. In a new building these areas often are placed in entrances where people are passing by. To put information in the entrances is however not always good according to Friskis & Svettis:

"We have information in the entrances, but there the visitors are on their way…We are looking more at how to show things inside the facility and where the visitors have spear time." (Friskis & Svettis)

People are seldom stopping and waiting nowadays, and therefore the communication need to reach the visitor during activities when they're not on the run. It was also considered difficult to find suitable places in buildings to both reach a high number of people and keep the number of information spots down.

Reaching the visitors

Most customers were active in all communicating channels in some way but had bigger focus on some of them. They explained it as it is nice for the visitor to get information through several different channels to not be bored but also to be able to understand the messages. Sometimes a picture is good, sometimes written information read at home is the best.

They were also aware of the fact that a lot of information and many channels can be good, but there is also a backside to it. If the visitor is receiving too much information they will eventually get enough which can affect their opinion of the company. The customers claimed that they don't want to force the visitors to be overloaded with information or intrude on their integrity. It is also difficult to reach out to the visitors since the digital society in general contributes to an information overload.

"The difficult thing is to reach out with the information since there are so much of it". (Friskis & Svettis)

To decrease the amount of impressions during the visit one way is to keep the interior very simple and clean, to not disturb the visitor with more than necessary. Even if there are messages, they shall focus on the most prioritized information and be related to the purpose with coming to the facility and the experience on site. "You have to choose where to place it and how much of it, there is a limit of what the visitors can assimilate…" (SF). A communicative solution needs to fit the overall concept and not disturb the visitor.

The most common tool for communication in buildings are digital screens, roll-ups or other paper solutions. One interviewed facility management supplier at Coor said that it might be difficult to argue with an end customer that they need screens since they have troubles to get return on the investment. S/he claimed that there are only some customers that would like screens or experience-based solutions.

One way of showing information in washrooms today (see chapter "8.1. *Existing washroom solutions*") is information on the inside of the door in cubicles and SWR:s. If these are made of paper or plastic with a thin frame, they can get damaged quite fast since the cubicle is a small space where it is easy to accidently touch the door with a bag or jacket. It was also considered problematic to change the information since the customer then must print a new note and change this manually in every cubicle.

Other paper solutions like magazines and brochures are used in public areas, but the disadvantage is that it isn't sustainable to print a lot of material, and that this way to communicate is slowly degrading and going towards more digital solutions much because of its inflexibility. The customers saw benefits in digital solutions that enables easily changeable messages to reach out to the targeted visitors.

Get knowledge of visitors

The customers don't only want to reach out to their visitors with information, they also want to receive opinions about their products and/or services to continuously improve themsleves. According to the Facility Management Supplier at Coor, restaurants and conferences need all external feedback they can get while office environments don't have the same need where the majority of users are employees.

How to get feedback

Most companies have some kind of feedback system nowadays, often available through websites or social media and not very often in connection to the washrooms. One type of feedback is received when people actively visit the webpage or other channels to leave their opinions. This is mostly done when visitors have strong opinions like complaints or questions and don't include general feedback. Another relatively passive way of collecting feedback is to post things on social media and measuring the response by measuring likes and reading comments by the followers.

If customers have the possibility, they try to receive as much feedback as possible mouth to mouth through available on-site staff. An alternative to this is the website chat-function or customer services that many customers provide to be able to give quick answers, even if the visitor then must approach them.

Another way of receiving feedback in a more active way, both positive and negative, is to approach the visitor and ask questions. The most common way of receiving feedback by approaching the visitors directly is through surveys that are sent out to visitors by e-mail after the visit. Through these surveys a lot of different information and feedback can be received, also about the washrooms.

"The visitor gets a link sent to them after the visit where they can answer several questions and answer how they experienced everything from entering the cinema until the movie ended and they went home. The whole turn is then included and then the washrooms as well, where they have the possibility to give their opinion, if there is something they miss or about the hygiene or so..." (SF)

This is working for the businesses that have control over the visitor data such as their e-mail addresses. One customer considers this as a problem:

"Our visitor, the traveller, is mainly customer to the tour operators, which means we are not in charge of the visitor data base." (Swedavia)

For these customers, it might be useful to provide this type of feedback on site. This type of feedback is not at all as common, but one way of doing it is to let the visitor give feedback when paying in the end of the visit, as they do at Peppes Pizza in Norway. It is convenient for the visitor to give feedback in connection to another action, but this is mostly done by larger companies and not smaller businesses.

"It's a bit expensive if only having one restaurant. Then it's better to focus on nice and observant staff that pays a bit extra attention." (Stylt)

Feedback in washrooms

All interviewed customers considered feedback to be a great way of developing and improving the business, but none of them had a functional system of receiving it in washrooms. One customer was satisfied with the feedback they got from other sources, and couldn't see they could handle even more feedback collected in the washrooms.

"We are getting so much feedback that it is a challenge to have time to follow up and process all thoughts that we receive." (GOT-event)

One customer claimed that feedback in washrooms is very interesting if it can be executed in a logistic and efficient manner;

"There shouldn't be too much that block the entrance, or someone stopping to write the answer of a question on a wall...When being there they don't want to be forced to stand and answer questions because that can create bad will for the visitor...the washroom is a sub-thing; it shall go smooth." (SF)

One problem with the existing feedback solutions with buttons to push is that it is difficult to know if the feedback is reliable or not. When people are given the possibility to pass by and give an answer very quickly with just a few options to choose from, there is a

risk that they just push a random button and not care about the answer. Especially if kids are involved, they could think it is amusing and push several times just for fun. It is also difficult to derive the reasons to the result with this kind of feedback since quick options don't tell why the visitors think something is bad or good. These factors make the existing solutions less useful for customers and facility managers according to marketing research at SCA.

What do customers whant to know?

The customers wanted to receive direct and local feedback from their visitors, meaning opinions, suggestions of improvements, error reports and the experience of the local environment. This was very valuable information according to the interviewed customers. This type of feedback can in some cases be good to provide in connection with the visit since much of the experiences and less important opinions can be forgotten if they give the feedback afterwards.

Other information that was considered valuable to collect was demographic data, economic data, insight in visitor profiles and their preferences and satisfaction. Another aspect of feedback that also could be beneficial is to get information about whether the visitor was content with the given information or not and if the message was received by the visitor. In many cases the customers display and send out information, but don't know if the visitor actually receives it. Some information can be received by the customer not only through feedback and direct communication with the visitor, but through analysis based on data collection from observations, connected products (IoT), sensors and data bases.

"The customers get excited by getting data and information of how things look. Essity should have all products connected". (Coor)

Follow trends

To increase profit, keep up with a competitive market and to gain a good reputation, being up to date with the latest trends might be a good strategy, whether it's about the latest technology or the latest trends in services and communication. One growing trend within the service industry is to communicate an experience. The demands on companies to provide a good user experience are growing both from end users and customers. It is descisive for if the company will stand out, which is realized more and more, and it puts pressure on companies to keep up and put focus on the user experience. The experience also needs to be stronger and clearer as more and more companies are stepping up their game. As soon as a visitor gets a great experience, the expectations on other companies increases. Companies within several businesses have realized that a lot of their problems are related to the user experience. In restaurant environments, which is one of the leading business areas within the experience industry, a good experience is not necessarily about providing a more luxurious or premium expression, but is more about offering something unexpected to the visitor.

The potential of washroom experiences

Businesses that put in work for the user experience often prioritize the primary service spaces, but the trend of providing experiences is slowly showing up in washrooms as well.

"It is a space that gets more and more love where you put more money and resources." (StyIt)

In the interviews, customers seemed to be more positive towards communicating an experience in washrooms than communicating a specific message. Some believed that the washrooms have potential since it is an important area that the visitors have relatively high demands on, not least on the hygiene. Therefore, it was deemed reasonable to put more effort into this area. However, the customers still weren't convinced that experience solutions would be worth to invest in, due to the short time that visitors spend in washrooms. It was found that the duration of a washroom visit can be a benefit, the risk of disturbing the visitors with too much information or impressions is because of it quite small. Also, the washroom is seldom expected to be prioritized, so the surprising effect can become bigger than if the effort would be put in other spaces. Since special experiences in washrooms still are rare, it is considerably easy to create a reputation and a mouth to mouth effect by making the washroom experience something extra. To present something unexpected is a way to get people to talk, and to design for an exciting experience or present a new technology is therefore a great marketing method to increase the number of visitors.

What to communicate

Customers today put effort on making the washroom visit a good experience mainly through providing good hygiene and functionality, but when the aim is to strengthen and extend the user experience as much as possible, customers need to communicate things beyond these factors. What the customers want to communicate is however not always thought through. Some just want to elicit a good washroom experience to show that it is functional and clean. Others want to communicate that they have an exceptional service, which isn't about the interior design but more about quick access to personal contact or constant maintenance, with the aim that the visitor shall be well taken care of by the staff.

"We have some old facilities which we have to consider and maintain in the best way possible. However, the service we give to help the visitors can in different ways compensate for that". (GOT event)

Another thing that was mentioned in the interviews was to communicate the brand values through an experience to create a special connection between the two. When the visitors have come to a place to get a fun experience, as for a fun park, the customer wants to give the visitors happy memories which then also saturates their communication:

"We want to give the guests happy memories…the whole spectra from playfulness to more mature and sophisticated". (Liseberg) In other businesses, brands would communicate other values that would be relevant for them.

How to communicate

Multisensory impressions

One way to communicate an experience is to focus on multi-sensory impressions (hänvisa till teorin?). In some environments, companies work with sound and scent strategies to communicate the desired atmosphere. It can be to play music from a specific playlist to create a more relaxed environment, as well as design the acoustics in the room to fit a theme:

"We've put in sounds in washrooms and it has been appreciated." (Coor)

When it comes to scents, some companies use their own signature scent that can be present in the soap, the air and in candles, but there are also air freshening systems that control the scent in the room. Problems with scents are that people have varying sensitivity to it and that chemical solutions are hot topics and not fully accepted.

Storytelling

To communicate a brand or a strong experience, communication agencies work with storytelling to create a coherent expression. If a washroom is designed for an experience, it is key that it follows the main theme and strengthens the experience the visitor got from the overall visit. All communication shall follow a story or a theme to reach the best effect.

"There shall be a red thread that makes the brand visible in everything we say." (Liseberg)

The total effect of storytelling can in some cases be that the visitors feel as they can escape reality for a moment, and to achieve this, all aspects must be thought of. Often, products in washrooms are not customizable and easy to fit into very expressive interiors, and there is no developed total solution for multisensoric communication. Stylt pointed out the potential with a product that provided coherent sound, light and scent:

"You know which potential effect this has. But the system for it is missing and it is a big risk and pretty expensive to develop it yourselves." (Stylt)

Innovation & technology

There are several ways to communicate something in a service environment, not only through text messages and visual material that communication can be associated with. What products that are used in the environment communicates something to the visitor and some customers want something extra from them:

"Jodabox, Beutybox, a phone-holder. It's not a problem if it doesn't exist, but it will give the little extra. Communication might not be the thing!" (Coor)

Common values that companies want to communicate through products and services are innovation and technology. These can be communicated by showcasing modern products

and something completely new to the visitors. "We want to work with the latest and have pushed for using robots. Like in Japan where they for instance have virtual receptionists" (Coor). There is a market for automated solutions both to communicate innovation but also to help increase standard. Some interviewed customers showed interest in Internet of Things and service solutions to improve the experience of good service.

11.3. Summary

A summary of the customer need areas and how they relate to each other can be viewed in Fig 44. A total specification of the customer needs is available in appendix 3.1, but the most prominent needs have been summarised and are listed below.

11.3.1. Primary customer needs:

- Provide a hygienic and functional washroom
- Enable efficient flow and good logistics
- Cost efficient solutions
- Get Knowledge of visitor frequency and logistics
- Get Knowledge about behaviours
- Get Knowledge of hygiene standard
- Provide local instructions of logistics

11.3.2. Secondary needs:

- Ability to reach out to visitors with a message
- To gain knowledge of the visitors
- Be competitive on the market
- Provide visitors with local, external or business-related information
- Get feedback and data of habits, opinions, behaviours and suggestions
- Create holistic experiences that the visitor will remember
- Inspire the visitors
- Communicate new technology

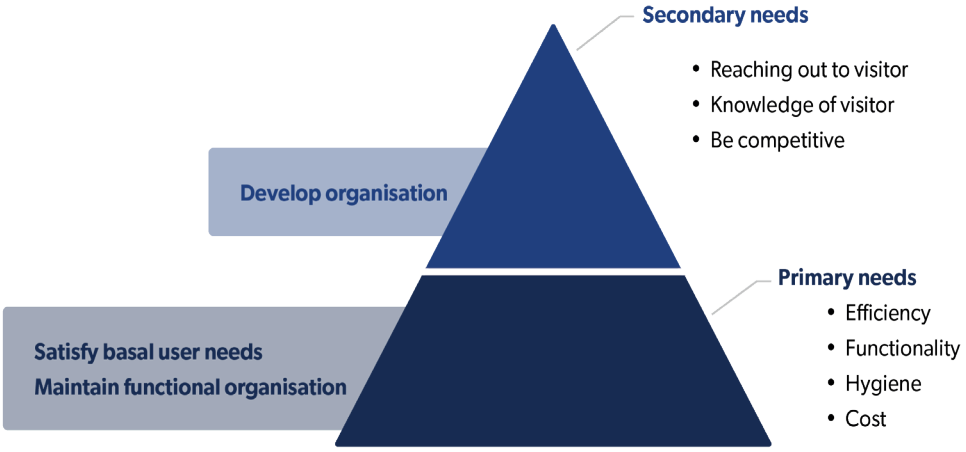


Fig 44. The concerns and need areas of the customer.

12. Problem and Effect Definition

The user and customer needs that were identified with the use of a KJ analysis (see chapter "*5.7.4. Methods for analysis and evaluation*") were further analysed into problem areas. The most critical areas that needed to be solved with a new product or service were identified, upon which a core need was defined and a new desired effect formulated.

12.1. Prioritized user need areas

In this project, the aim was to focus on the user needs. As mentioned in chapter "*10.2. The user needs*", the basic needs must be fulfilled before the psychological or self-fulfilment needs can be achieved. In this project, the basal needs should not drive the development; since there already exist good solutions and conditions for the basal needs to be met, and in order to aim for an as great user experience as possible in the project, the development should address the needs in the top of the needs pyramid (see Fig 45 and Fig 46). This does however not mean that the basal needs should be neglected, they must still be met but should not function as the foundation for development.

The need areas were evaluated through a PUGH-matrix (Fig 47) according to what was considered interesting aspects for a development project at Essity. The evaluation showed that a solution which "elicits a private experience" would have the greatest effect on the user experience together with "enhancing the hygiene experience", but the privacy aspect was considered more innovative and interesting to focus on. Both "added value" and "enhance hygiene experiences" were still interesting to take further, but the problem of stigmatization around washrooms were excluded from further development. This decision was made because it was considered a too extensive aim to change a structural societal problem, of which the outcome also is unclear. Furthermore, changing the view on a stigmatized subject would take long and have an indirect effect on the users first in the long run. Lastly, it was deemed necessary to choose a direction and narrow the scope.

Fig 45. User need areas from psychological and self-fulfillment needs

Fig 46. Customer need areas from secondary needs.

	Create added value	Enhance the hygiene experience	Minimize stigma	Elicit a private experience
Possibility for implementation	3	2	1	2
Innovation	3	1	3	2
Improvement of user experience	2	3	2	3
Visitor acceptance	2	3	1	3
Match Essity´s brand	2	3	1	3
Expansion possibilities	3	2	3	3
Useful in all segments	1	3	2	3
Total score	16	17	13	19

Fig 47. PUGH-matrix of user need areas.

12.2. Correlation of User and Customer needs

From the customer needs identification, it was found that the customers had the need to elicit a pleasant user experience and provide extra value to the users. This was in line with the prioritised user needs (Fig 45); parts of the secondary customer needs correlated with the psychological and self-fulfilment user needs (as displayed in Fig 48), which - if fulfilled - was anticipated to elicit a good user experience in the washroom. Since it would benefit both user and customer to elicit a better washroom experience for the user, it was appointed as the core need.

Core need:

To elicit a better washroom experience for the user.

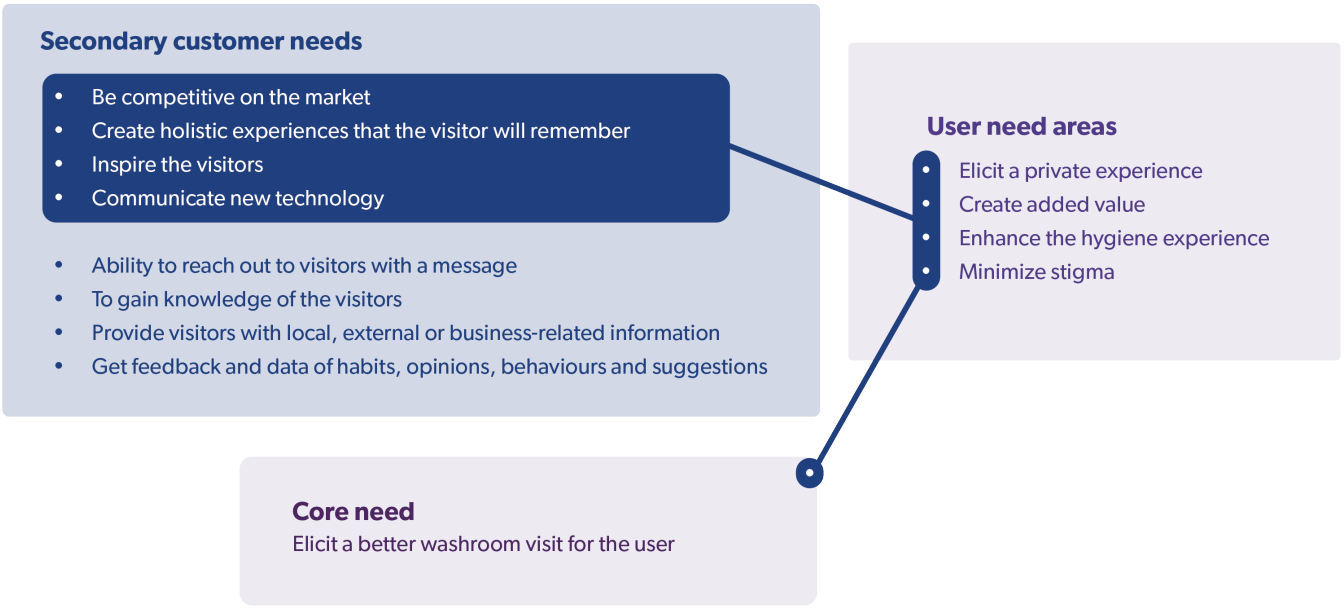


Fig 48. Correlation of user and customer needs

In current washrooms, communication solutions are not very common, but communication needs could nevertheless be identified (see Fig 48 above) in the needs analysis. Communication can be used as a tool for several purposes, and to succeed with integrating communication in a solution that ouht to solve the core need, it had to be regarded early in the process. Hence, to succeed with a communication solution it should fulfil internal customer needs of communication as well as solving the core need: To elicit a better washroom experience for the user. Consequently, the customer needs of communication that didn't correlate with the core need (see Fig 49 below) were synthesized into two need areas that were deemed important to include in the upcoming development.

- Enable customer to communicate information to visitor
- Enable the customer to receive information from visitor

12.3. Development of desired effect

From the core need and the integration of communicative needs, a question was formulated:

"How can communication be used as a tool to have the desired effect on the user AND be beneficial for the customers' internal needs?"

This question, together with a formulated main effect and effect-guidelines originating from the customer and user needs, composed the foundation for the concept development.

12.3.1. Main effect

An enhanced user experience and increased communication values in the washroom

Effect-guidelines for development

- Elicit a private experience
  - Feel anonymous
  - Not feel obserevd or disturbed by others
  - Communicate with/to other visitors and cleaners for avoidance of awkward situations
  - Not hear or be heard by others
  - Not be disturbed by or disturb others with odours
  - Feel at home
- Enhance hygienic experience
- Create added value
- Communicate information to visitor
- Receive information from visitor

Fig 49. Customer needs that don't correlate with the user needs.

13. Concept development

The concept development followed an iterative process in two iterations, each including the activities of ideation, synthesis and evaluation. The ideation was based on the main effect and effect-guidelines presented in the previous chapter and led to the creation of eight concepts that were presented and evaluated with employees at Essity. This evaluation constituted the foundation for the second iteration which led to new functional guidelines for the final concept. The procedure of the iterations is described in detail in the project execution; chapter "*7.3. Phase C - Use Design*".

This chapter describes the two iterations of ideation, synthesis and evaluation. The ideation and synthesis describes the functions and motivations of developed concepts and the evaluation describes the decision making and reasoning behind discarded and chosen concept for further development.

13.1. Iteration 1

From the main effect and effect-guidelines that describe the core need, the first iteration of concept development was conducted (for method see chapter "*7.3.2. Iteration 1: Eight elementary concepts*")

13.1.1. Ideation and synthesis into elementary concepts

The first concept generation resulted in eight elementary concepts that were built on different ideas and problem areas combined. Some focused on the private experience while others focused more on the communication benefits. They all had different functionalities and technical approaches for solving the problems which are described further.

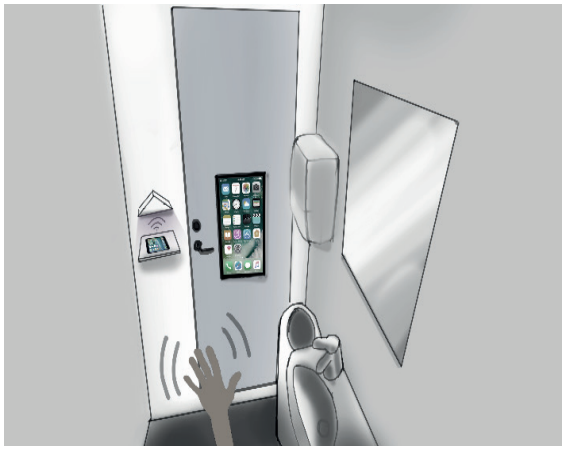


Fig 50. The concept "Connected"

Connected

Use your device in a hygienic and efficient way.

This concept is based on the fact that people use their mobile phones inside washrooms despite contamination risks. Instead of preventing the users from doing so, this concept enables them to use the phone, but without hands. When entering the room, the phone can be placed on a shelf where it connects to Wi-Fi and gets sterilized from bacteria through UV-light. Meanwhile, the phone can be maneuvered with motion gestures. It is suitable in the WR Plus or WOW Factor style segment and where the user has time to sit down for a while.

Easy Show

Neat and flexible display of content with a high hygienic standard.

Easy Show is a neat and flexible solution for displaying information without putting anything on the wall. The image is displayed with a projector which can be placed in the ceiling. It starts casting when the user enters the room to catch the attention. Easy Show is suitable in most washrooms.

Mirror Control

Giving feedback in a smart, fun and private way while looking in the mirror.

Mirror Control is a smart interactive screen that tracks the user's motions and gestures when standing in front of the mirror inside a SWR or cubicle. The interface has fun applications that are dynamic and change dependent on the activity in the room. The user has the

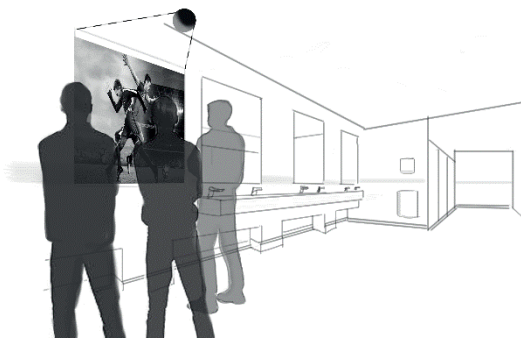


Fig 51. The concept "Easy Show"

possibility to control the music by some presets to personalize the environment. Through the interaction it is possible to give feedback as well as call for maintenance services. This solution is for SWR:s and suitable in places where the user isn't in a rush. Thereof, it is suitable in WR Plus or Wow factor Style washrooms where the flow is constant and doesn't have a lot of visitor peaks. It fits customers that prioritize a good user experience over efficiency.

Feed Fun

Give feedback in a fun way

This concept uses electric glass over a mirror in the basin room. When applying power, the glass is clear which makes it look like an ordinary mirror. When switching the power off, the glass becomes frosted or tinted white which makes it a good surface for projection. The surface can thus be used both as mirror and for displaying content. The switch can be connected to motion sensors or other sensors like the water tap. The interface is interactive with possibilities for the users to explore, be inspired, play games and give feedback. There is a cleaning device that frequently and automatically sterilizes the surface. The concept is good in medium volume washrooms when the user has time to explore it while waiting. In an empty washroom, the user might pass, and if it's too crowdy, a person standing still might be annoying for others.

360 Expo

Giving the users a wow-experience by letting them enter a whole new world.

360 Expo is a concept that makes it possible to customize the washroom's expression to fit the end customer's shifting needs of communication. It has branding possibilities through it's 360 degrees' projection that covers all walls of a room, leaving a strong impression. The projection is dynamic and reacts to the visitor's motions, making it possible to integrate feedback. It gives best effect if it is visible when entering a room and if the user has to spend some time in the room. If there is a risk of queues, 360 Expo is suitable in the basin room to not prevent the flow, otherwise it's better inside cubicles or SWRs where they spend most time. It is also suitable for customers with focus on experience, WOW factor style, for example where the washroom should match a theme (as for restaurants and hotels).

Fig 52. The concept "360 Expo"

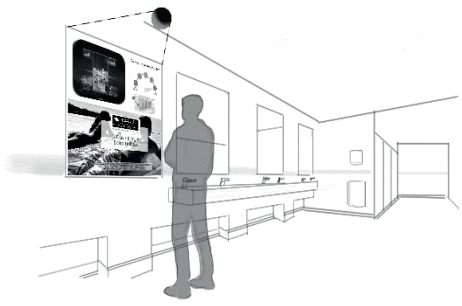


Fig 53. The concept "Feed Fun"

Fig 54. The concept "Mirror Control"

Privacy Friend

A unit inside the cubicle that helps to get rid of smells, hide sounds and inform about the situation outside.

Privacy Friend helps the visitor to keep control of aspects that disturbs the privacy of the washroom visit. This unit informs the visitor if there is someone else in the washroom to consider or if s/he is alone. It also shows the odour situation and there is a possibility to mask odour by adding artificial scents in the room. This **would** help to avoid awkward social situations as the user could avoid disturbing other visitors. It is also possible to regulate and add sound, all through touch-free interaction. The concept is suitable in all types of washrooms, particularly when there is risk of high visitor volumes and queues as well as at very quiet places. It is a small and neat product that can fit into many washrooms.

Robot

Personal and non-intrusive service at world-class quality

This humanoid robot takes care of the guests and escort them to the best available cubicle. It can retrieve audial or typed questions or feedback, and provide the visitors with answers and help. It is a loyal host to entrust with all occurring situations. It also keeps the washroom tidy with constant maintenance. This is a concept that suits the WOW Factor style segment and works best in contexts with steady flow and high volumes.

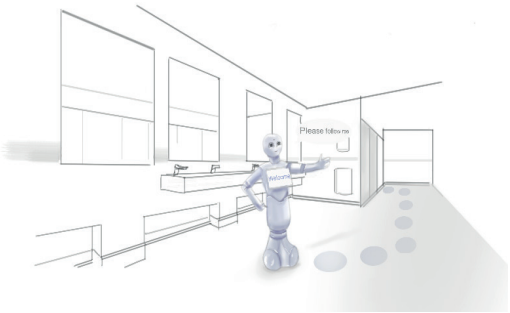


Fig 57. The concept "Robot"

Best Cubicle

Showing vacant and occupied cubicles and gives a recommendation of which one to take

Visitors make active choices when they pick one cubicle out of many, and to know which ones are occupied, or the freshest, the indicators on the doors automatically guides the way to the most hygienic and well-scented cubicle available. This makes the visit both more efficient and increases the hygienic experience, it also decreases the risk of the user feeling anxious. The recommended cubicles are shown based on data about visitor frequency and odour sensors in each cubicle. The concept is combined with the function to report from the inside of the cubicle that maintenance is needed. Best Cubicle can be used in all segments but preferably in WR Plus or Essentials which might have the highest volumes.

Fig 55. The concept "Best Cubicle"

Fig 56. The concept "Privacy Friend"

13.1.2. Evaluation of Elementary concepts

The eight concepts consisted of combinations of ideas and functions from the first ideation. They were evaluated based on how well they would fulfil the effect-guidelines in general, user needs, customer needs, the commercial benefit for Essity and the implementation possibilities. The total evaluation in this iteration step was done with a vv matrix (see appendix 9), discussions with employees at Essity and supervisors. It resulted in continuous work with four of the concepts and this chapter describes the decision making behind the choices.

Evaluation Criteria

In the concept evaluation, everyone involved regarded the user needs satisfaction as the main focus. Another aspect considered was the market possibilities for the concepts; if they would fit into many washroom segments or in a specific niche. Essity also emphasized the implementation possibilities with the Tork brand and the customer benefits to be impactful on the decisions.

An interesting factor for Essity that was discussed in the evaluation, was whether the product fit the competence within Tork and if they could provide the technical solution themselves, or if the solution should require a cooperation with an external part. It was considered a chance for Essity to investigate some new fields through the choice of concepts outside their normal product categories. Thus, this was not regarded in the concept evaluation.

Concepts to discard

Four of the concepts were discarded for different reasons in the evaluation, and these were Easy Show, Connected, Mirror Control and Robot.

Easy Show had many communication benefits by being able to display flexible content at several places and surfaces. However, this was a scaled down version of the concept Feed Fun since it lacked the feedback feature. Easy show was the least innovative concept and similar solutions are already out on the market. This made it less interesting to investigate further.

Connected was discarded because it didn't promise a large effect on the user and it was difficult to determine whether it really would be useful or not. It could also have the unwanted effect of the user staying for very long in the washroom. Further, the user would have to actively take a decision to use the service and initiate it themselves, which decreases the chance that it would be used.

Since Mirror Control was placed inside the washroom, the usage was limited to the normally short time the users spend in there. Mirror Control could thereby lead to longer visits and decreased efficiency, and might fit better in a hotel room than in the washroom context. Since a mirror would be required, the amount of suitable washrooms were limited. There were also some questions about how the interaction would function and if there might be integrity issues of having it inside the SWR.

Robot was an interesting futuristic concept which was seen as an inspiration for further innovations since it was a total solution. Unfortunately, it was too conceptual and futuristic to fit in the frames of the thesis work as the development potential was limited.

Concepts for further development

The concepts that were further developed were Privacy Friend, Best Cubicle, 360 Expo and Feed Fun.

Privacy Friend was the concept that focused on improving the experience of privacy through increased control by means of simple functionalities. It was a neat product that could fit into a SWR or cubicle just as many of Tork's products today. It would also be relatively close to SCA's competence area and brand by caring for the user and their wellness. Because of the potential to reach the overall effect of a pleasant user experience it was taken to further development even though the customer benefits needed to be further investigated.

Best Cubicle had many customer benefits compared to the other concepts and would be a natural addition to Essity's and Tork's solutions today. It had the focus on improving the hygienic experience for the user as well as facilitate maintenance for the customer which can create a big effect. It was taken to further

development even though it was considered to be less innovative than the other concepts.

360 Expo had few connections to Essity and Tork but was because of this considered to be very exciting and interesting to look further into. There was high potential in creating a pleasant spatial experience through projection and to integrate customer beneficial communication.

Feed Fun was a wide concept with many functions and benefits that was interesting to investigate further. It was a solution that could be useful in many washroom segments and both give the user a fun experience as well as provide flexible digital communication possibilities for the customer, as the customer should be able to change the communication digitally. It wasn't considered to elicit extraordinary experiences but had potential in that aspect. The placement in the basin room was chosen to get attention and increase the feedback from people. Feed Fun included one interactive part intended for entertainment and one for feedback. The idea was to let curious people, that normally would press buttons just for fun, instead play a game and thereby increase the reliability of the received answers from the feedback possibility.

13.2. Iteration 2

To be able to reach the desired effect with the concepts, the usage needed to be designed and this was the focus in the second iteration. The ideation and analysis resulted in three use design concepts that were evaluated through workshops.

13.2.1. Ideation and synthesis of Use Design Concepts

An analysis and further ideation and development of the four most interesting concepts was done with the usage in mind. This resulted in three use design concepts described by storyboards. The procedure of the usage analysis is described in chapter "7.3.1. *Analysis of usage*"

The placement affects the usage

Both 360 Expo and Feed Fun intended to be placed in the basin-room and catch the users' attention before or after they walk into the SWR or cubicle and encourage some kind of interaction. In the usage analysis, it was discussed whether this placement was optimal to elicit the desired effect. When there's much people in the basin room, the users adjust to others and stand in line waiting for their turn. Their positions in the washroom is thus steered by the queuing system and the user won't leave the place in line to interact with something. This put demands on the product to be placed where people can interact without preventing the flow or take more time from the user. When the user goes to the washroom the aim is one thing, to use the toilet. They would not stop to watch something unless they must, and even if there's a queue and they need to wait, they might be too distracted or uninterested to watch or interact with something. The risk is that they just pick up the phone as usual if it is convenient. If everything runs smoothly the user spends most time inside the SWR or cubicle. Further, to have feedback possibilities (which is the biggest customer beneficial interaction) before the visit didn't seem to fulfil the effect since it is easier to give response or feedback to something during the actual visit when the experiences trigger the thoughts, than giving it before or after. If people give feedback in the queue, they could only give input on the outer context and not the washroom standard. After the visit, the user probably wants to get out as

fast as possible and not stay unnecessary long just to give feedback or interact.

One risk of having fun interactive feedback, as for Feed Fun, was that the feedback system could be occupied for entertaining reasons rather than giving feedback. Then people would not have the possibility to interact at the same time. Another aspect of having a solution in the basin room is that it is a public place and people might not like to give feedback or interact when other people are watching. The chance that a visitor wants to give feedback could increase if it is placed inside the cubicle or SWR in a private space. However, as mentioned earlier, there is a risk that interaction inside the cubicle makes the user feel monitored, and therefore such interaction needs to be well executed to make the user feel safe.

Expo Cube

After the analysis of how placement affects the usage, the functions of Feed Fun and 360 Expo were combined to one new concept since the usage of them was very alike. This was called Expo Cube and enabled sounds, air freshener, visual content and touch free interaction and was a total integrated unit or "cube" that could replace a normal cubicle. This contained all the necessary products, projections with the possibility for the user to change theme and feedback possibilities.

Consequences of creating a cube could be increased privacy as the user could be inside an isolated room as well as a more pleasant basin-room as it becomes better shielded from smells and sounds from the toilets. There were also possibilities to incorporate efficient maintenance services since each cube could be controlled by ID-numbers.

The projection of images in the whole room, as 360 Expo included, was a bit complicated in the large basin-room due to large areas to cover as well as many different products used and varying looks. This could still be a problem inside a cubicle or SWR but not as big if the cubicle could be designed to fit the concept. The function of having an interactive surface, as in Feed Fun, inside the cubicle was considered too unhygienic and therefore Expo Cube used touch-free interaction.

With Expo Cube, the usage could be quite like how washrooms are used today. The basin room would not change and the visitors would focus on reaching the cubicle, but the usage inside the cubicle might though change with Expo Cube.

The usage was described by the storyboard and the text:

The user walks inside, not prepared for the experience that occurs when opening the door. S/he is using the toilet as usual but is entertained meanwhile. The user is asked to decide the theme inside the cube and give feedback. This is made by game-like interaction with moving objects on the walls through large arm gestures.

Fig 58. The Use Design concept "Expo Cube" as a storyboard.

Privacy Friend 2.0

Privacy Friend was already a concept placed inside the cubicle or SWR and was kept that way in the next version of the concept; Privacy Friend 2.0. The usage analysis however highlighted how the usage can differ dependent on the mental model and personality of the user. If the user doesn't have a problem with smells and sounds in the outset, a solution like Privacy Friend could instead remind the user of this and create a problem that didn't exist. Further, to see how many washroom visitors that are waiting outside could also be problematic and elicit new negative emotions as anxiousness and stress. The result could also be that the user feels less private knowing about the people waiting outside.

Therefore, Privacy Friend 2.0 was altered. The user should now be informed of when air freshener is added and not of how the scent is changing in the room. The user only receives feedback of positive added scents that can strengthen the self-consciousness.

In the same way, the music shall be in the background and added sounds shall not be too exposing but fit with the music. The interactive feedback from Feed Fun was integrated in the concept and ought to be controled with motion sensors. Displaying how many people that are outside was no longer included in the concept. The usage can be described by:

The user goes inside the washroom and straight to the cubicle if free. S/he is sitting down on the toilet while music is playing in the background. The user is worried if someone is going to hear something when the interface shows the option of using cover-up sound that is turned on by gestures. The air freshener is automatically activated which is displayed in the interface together with some information or advertisements. Before the user leaves, s/he gets the possibility to grade the satisfaction of the visit.

Fig 59. The Use Design concept "Expo Cube" as a storyboard.

Best Cubicle 2.0

There were no direct issues found in the usage analysis of Best Cubicle, and therefore the upgraded version Best Cubicle 2.0 didn't include any large changes. It was however a bit more detailed.

Best Cubicle 2.0 was a concept that aimed to elicit better user experiences by clearly showing the visitor which cubicles that are occupied as well as recommended cubicles based on hygiene standard. The information should be displayed on the doors or the floors and the recommendation should be based on smell, usage frequency, time from last usage and appearance. This information is collected through a room scanner that evaluates the hygiene standard after each use and should also be received by the maintenance staff to increase the maintenance efficiency. If the standard in a cubicle is considered too low, the cubicle will automatically be locked to prevent the user from going inside and receive a bad experience. The concept includes an automatic air freshener to improve the experience of hygiene. One aspect that was discovered in the usage analysis was that the user could feel exposed if the cubicle was not recommended after the use. Therefore, all cubicles shouldn't be marked all the time and several cubicles have unknown status.

The main effects from this concept is that it prevents the user from getting bad washroom experiences and elicits better hygiene experiences than normal since the usage strain can be distributed more evenly and maintenance can be increased. The usage itself will be more efficient since the user finds the vacant cubicle faster but also because s/he is helped to make the decision and doesn't have to look for other cubicles. Another user benefit is that the user can feel more anonymous and secure after the visit since the risk that someone else enters directly afterwards is reduced. The usage is explained by:

The user enters the washroom and sees different information inside the basin room. Some doors are showing that the cubicle is occupied, some shows "loading" because they are getting scanned at the moment and one or two cubicles are marked as the recommended. The user walks directly to one of the recommended and find a nice and tidy cubicle to use. After the user has left the cubicle it is marked "loading" until the standard is clarified and approved.

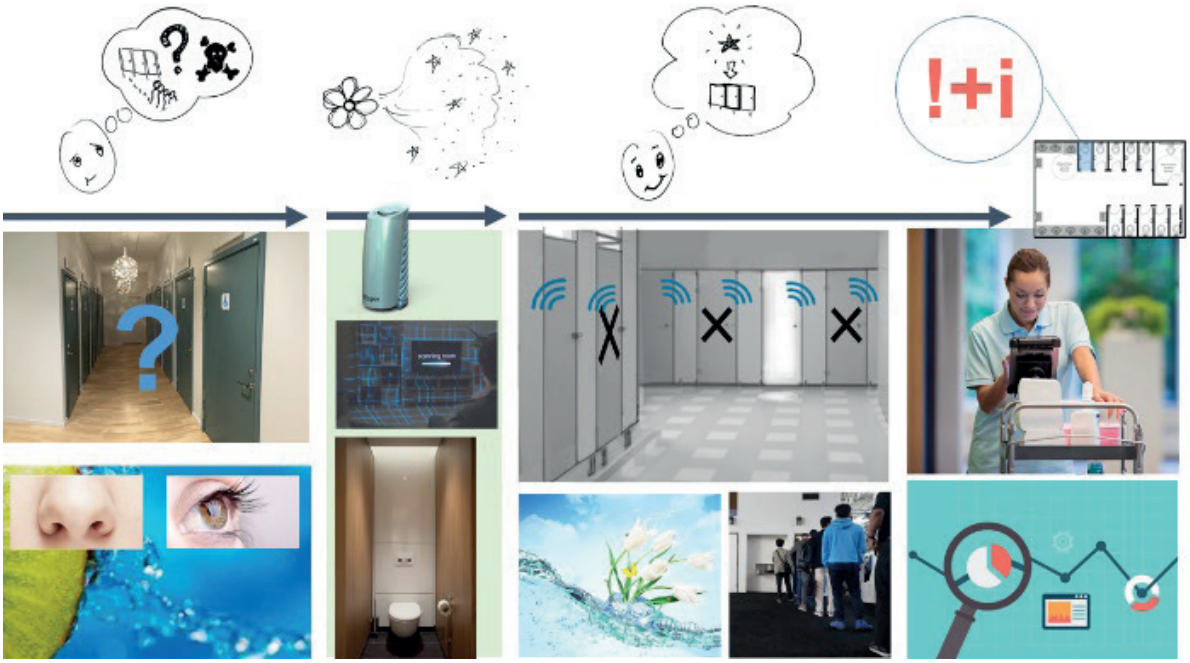


Fig 60. The Use Design concept "Expo Cube" as a storyboard.

13.2.2. Evaluation of Use Design Concepts into new guidelines

A last evaluation was made of the three Use Design concepts in discussions with supervisors as well as through small workshops with potential users to get more perspectives on the solutions. Based on this evaluation, functions and parameters in the three concepts were chosen to be developed further in the final concept. This chapter describes the summarized results and reasoning of the evaluation and decisions. The full workshop result can be seen in appendix 12, *Use design concept workshop result,* and the method in chapter *"7.3.3. Iteration 2: Three use design concepts"*

Discard Best cubicle

The users in the workshops were positive to hygiene and efficiency benefits of Best Cubicle 2.0 and that it could discover deviations in the maintenance system. One aspect that was mentioned was that it is important that the given information is not too detailed. The users didn't want information about why the cubicle was recommended or how many visitors that have been there. Too much information can make the user interpret the information in different ways. It was also clear that how the visual information is presented is important so that it feels safe to enter.

Best Cubicle 2.0 was an appreciated concept with high potential according to both the workshop participants and Essity. It fits well to the business area and brand of Tork, and Essity is already doing some investigations in the field. The concept was useful for Essity and could work as material for further development of similar solutions.

As the concept is improving the experience through hygiene and efficiency benefits mainly, it has the focus on the basic needs of the user and the primary needs for the customer. Since improvements in this fields are ongoing, it was considered more interesting to focus on a private experience and extra value for the visitor as well as the secondary needs for the customers. Therefore, the decision was made to not continue the development of Best Cubicle 2.0 in a final concept.

Communication appreciated in Expo Cube

Expo Cube and Privacy Friend were both focusing more on psychological and self-fulfilment needs as well as focusing on the secondary customer needs of communication. Expo Cube was appreciated for the entertaining values and the participants in the workshops thought it might be a fun experience that should fit well into contexts with a message or expression to communicate. They liked the surprising effect but mentioned that it can be too much if the impressions are very strong. They had different opinions of how visual information should be shown and thought the execution could be very important. The users also thought it was nice to be able to give feedback. The communication possibilities for the customer was considered to be a very important aspect and something that would be interesting to develop further.

Taking away the Cube

In the workshops, the privacy effect of walking into Expo Cube was appreciated since it was isolated, but the participants had some issues regarding the space. It was considered important that one could be oriented inside the small cube to not feel claustrophobic, and to be able to turn the concept off if needed. The participants also mentioned that the isolation wasn't necessary to feel private if they could feel that no one would hear them. Expo Cube was according to Essity considered to work as a futuristic concept but they didn't consider it probable that they would make this type of interior solutions and deliver total cubicles. Expo Cube can mainly be used in new construction and the market for existing facilities would be limited. The idea and functionality was however interesting to proceed with. The difficulties of developing a total integrated solution led to the decision that the solution must fit in all washrooms, and that the cube should be discarded. Though, the solution should still be placed inside a cubicle or SWR.

The backsides of having a solution inside the cubicle or SWR should not be neglected. One risk is that the user might find it too pleasant and wants to spend more time than necessary in there and thereby decrease the general efficiency in the washroom. It is therefore important that the usage is designed to be short and efficient.

Another aspect is the cost, an important factor for the customer. To have the solution inside the cubicle or SWR and not in the basin room implies much higher cost for the customer. The number of required products in a washroom is rapidly increased, and with it, the probable customer range for the solution is limited, putting the product more in a premium range. As mentioned earlier in the report, this is not a problem due to the scope. In a later stage, the economic aspect needs to be evaluated compared to the achieved effect to know if the solution will be affordable and profitable for the customer.

Sounds interesting to investigate further

Privacy Friend 2.0 didn't get a lot of positive responses in the evaluation. The added masking sound in cubicles might result in some contradicting effects. It can both make the user feel private when covering up unwanted sound, but also exposed when other visitors pay their attention to the cubicle. The participants in the workshops said they should feel less exposed if they knew people outside the cubicle were distracted by something else. Therefore, it was considered better to use sound or music in the basin room rather than in the cubicle.

In the workshops, the users didn't think the masking sound could be enough to elicit a private experience and saw many obstacles for such a function to work properly. It could take time for users to accept and get used to such a concept and many things must correlate. However, if the solution is very well executed so this would work, the users claimed that the effect could be rather big. Despite the indecisive effect of the masking sound it was decided to take this function further to investigate how it could be executed to serve its purpose and reach the privacy effect.

Scent not regulated by user

Another aspect from the workshops was that increased control of the situation doesn't have to be beneficial. It can make the user feel anxious and worried of doing wrong and demands the user to take active decisions. It was deemed better if more things were automated; the information of scent levels was thus not necessary to take forward into the final concept.

13.3. Functionality of the final concept

This chapter describes how the decisions from the evaluation led to the functional frames of the final concept. What functions to use in the final concept were motivated and transformed to requirements and guidelines through a function analysis.

13.3.1. Function analysis and requirement list for final concept

After deciding what direction the final concept should take and that it should be based on functions from the two concepts Expo Cube and Privacy friend, a function analysis was conducted. (see Fig 61) It described what technical functions the solution should have in relation to the main effect, the needs identification and the decisions made during the development. A requirement list of the final concept was derived from the technical functions, and this is viewable in appendix 4, *Requirement list*.

The main function was formulated from the effect. The subfunctions are thus necessary functions to fulfil the main function and thereby reach the effect.

The function analysis also included the customer related supportive functions and requirements. As mentioned earlier, these functions are necessary to be aware of and a solution must fulfil these requirements to succeed, hence, included in the requirement list. However, the desired effect and so the development was not focused on the internal customer values but the user experience, and the derived guidelines for the final concept was so forth covering the subfunctions and requirements.

13.3.2. Functional Guidelines for final concept

The guidelines are based on the function analysis and requirement list and they summarise the key functions that the final concept shall include to reach the effect of "A better user experience and increased communication values in the washroom".

- Enable implementation in existing washrooms and contexts
- Provide interactive feedback inside cubicle or SWR
- Provide touch-free interaction
- Prevent the user from feeling monitored
- Enable efficient interaction and usage
- Elicit private and pleasant experience through multi-sensory impressions
- Enable communication of information from customer to visitor
- Provide communication that contributes to a better user experience

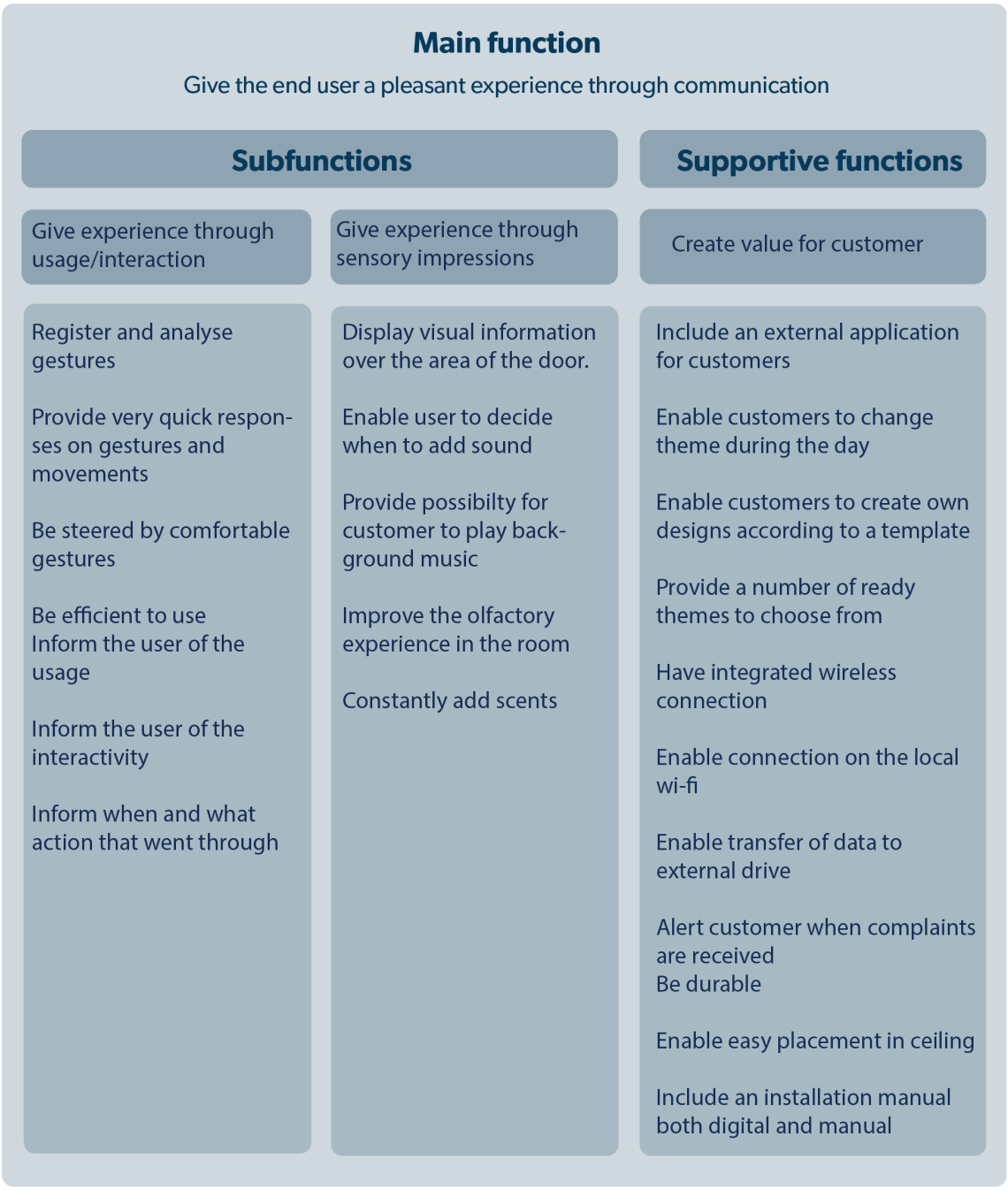


Fig 61. Result of function analysis

PART 2
SoliQube

In this chapter, the final concept - SoliQube - is initially presented with a Story Board that describes the intended user experience of the washroom visit. Further the development and the evaluation of the concept is presented in two separate parts; chapter *"15. SoliQube – The impressions"* and chapter *"17. SoliQube – The interaction"*; that account for the unidirectional and the two-way communication-part of the concept. A summary of the concept evaluation marks the end of Part 2 with the chapter *"19. SoliQube – The final guidelines"*.

14. The Experience

The intended experience of SoliQube is described through a Story board, picturing the experience of Holly visiting a washroom that contains SWR:s in a basin room (which is the best layout for the user experience as shown in chapter *"10.2. The user needs"*). How the experience would be altered through several executions are furthermore presented and motivated. The design for the intended experience is based on the development in the Overall Design phase. The procedure of this can be seen in chapter *"7.4. Phase D - Overall Design"*.

14.1. 1 Holly in SoliQube

Holly enters the basin room and finds herself in a calm atmosphere with some background music going on. All single washrooms are occupied at the moment but she doesn't really mind because she feels pretty relaxed.

When somebody leaves, she walks to the vacant washroom, and when standing with the door at glance she feels a subtle scent of nature. The washroom is bright and she thinks it looks clean and hygienic and feels satisfied. When walking inside she hears the sound of nature fading in. Holly becomes a bit surprised and looks around in the washroom to see what else there might be in there.

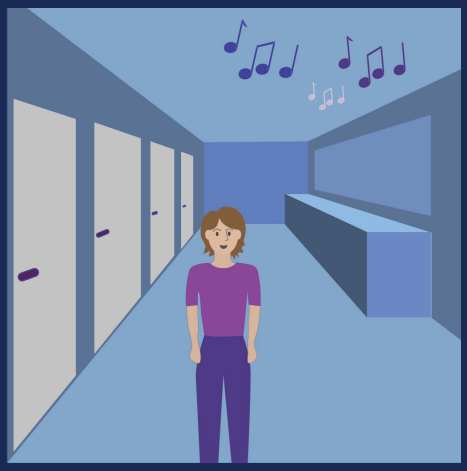
She walks inside and locks the door behind her. While facing the door, a small picture appears on the door above the handle and spreads slowly until it covers the whole inside of the door.

At the same time the lighting is slightly dimmed and shifted in colour. Again, she becomes surprised and a bit amazed. When the initial feeling of surprise has settled and she understands that nothing more will happen, she begins to take in the impressions and she feels interested, curious and a bit excited. Holly notices that the image is actually a film of a nature scene. She puts the jacket on a hook on the side of the wall and prepares for the visit.

Holly gets seated on the toilet and scan the image on the door. It is hinting about its gesture controlled interactivity, and she sees some alternatives. She tests out to navigate in the way that seems right, and when it works it is surprisingly fun and satisfying! She understands where her hand gestures are registered which makes her feel calm and in control. Holly tries out the feedback option and chooses answers to a few questions in a quick and effective way. When being thanked for her input she feels a little proud of having contributed.

Holly feels that there might be some uncomfortable sounds on their way and she chooses the “sound alternative”. Here Holly puts on an audio loop that fit into the nature theme, and she feels more comfortable to carry out her needs as the audio loop masks the sounds. This makes her feel less exposed and contributes to a more private and isolated experience where she is more in control.

The nature film in combination with the sounds and scent makes her feel relaxed and safe, it almost feels as though the door is a window to that world which makes her mind drift away to distant places.



She is now done with the visit and leaves feeling a little happier than before. She wants to tell her friends to visit too!

14.2. Two executions

Creating an as pleasant experience for the visitor as possible and at the same time enable visitor-targeted information in the SWR or cubicle was deemed to be conflicting goals; conveying a message was not considered the ultimate means to elicit a positive experience.

The decision was thereof made to create two executions of the concept with different orientation, one that was information-oriented called INFO and one that was experience-oriented called THEME, - the execution presented above in the Holly in SoliQube scenario.

The choice to make two executions was also based on the intent to be able to test them with real users and compare them to each other. What the visitors in reality would think of being targets to information or advertisement in the washroom remained to be answered in the user tests. What was known was that they wanted peace, quiet and privacy, and that the washroom visit was a moment of alone-time.

Also, the customers were keen on not burdening their visitors with information, and some were only interested in the effect of a better visitor experience, not a communication platform. With two executions, the customers are enabled to choose and alter the main purpose with the solution after need – conveying a message or elicit an experience.

THEME is using a still film of a scene with associated natural sound and scent with the intent to form a strong and coherent expression where the unity of the multimodal stimulus is more effective than its parts alone (further described in SoliQube – the impressions). The customer can choose to use already existing themes or create one after need.

INFO is using a still image with a message together with music and scent of the customer's choice.

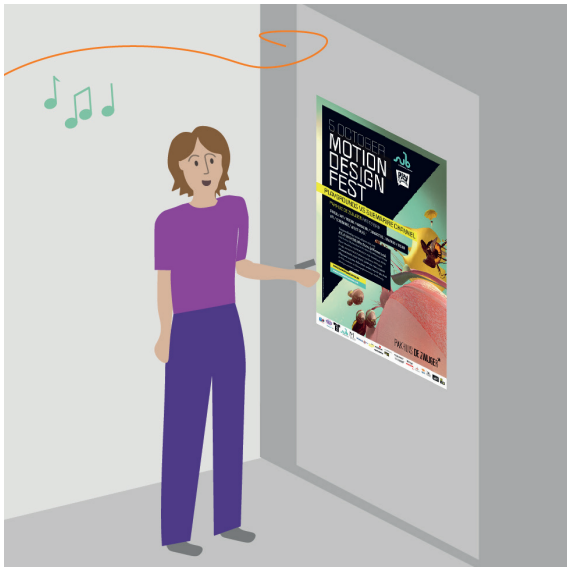


Fig 62. The INFO execution of SoliQube.

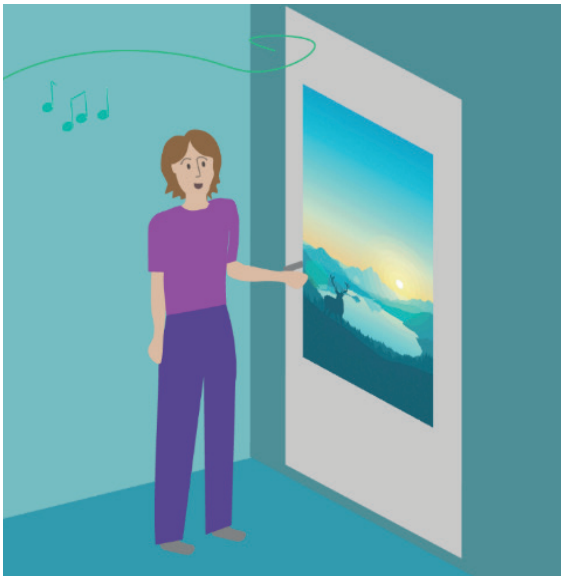


Fig 63. The THEME execution of SoliQube.

15. SoliQube – The impressions

In this chapter, the unidirectional communication-part of the concept is accounted for, being what only aims at giving the user an impression whilst being passive. The concept execution is motivated under *"17.1. Development"* and the concept evaluation – the result from the user tests and its analysis – is presented under *"15.2. Evaluation"*.

15.1. Development

The development and the motives of the concept executions according to impression are explained in two chapters; *"15.1.1. The usage" and"15.1.2. Content"*. These chapters answer the questions how and why the usage is designed the way it is with foundation in tests with sound and image and literature studies (see chapter *"7.4.2. Quick testing of projection and sound"*). The usage was also designed with the help of the Hierarchical Task Analysis (HTA) and the usage map (see appendix 8, HTA and 10, Usage map) to facilitate connection of where, when and how specific events should take place with the tasks carried out by the user. (See chapter *"7.4.1. Usage Map"*).

15.1.1. The usage

Multisensory experience

The user experience

A person's sensory experiences underlie how s/he experience the surroundings (Lindström 2005, referenced in Möller and Toma 2017) and from the user study, it was concluded that the washroom is an excellent environment to use sensory stimulus of different modalities to form an atmosphere in the washroom and elicit a better user experience. Several sensory impressions; smell, sound image, the visual impressions including spatial impression was found in the interviews (see chapter *"10.2. The user needs"*) to impact how the washroom visit was experienced.

Audial, olfactory and visual stimuli is used to elicit a multisensory experience where all modalities in the concept have a desired effect which are described below. Also, it is with all sensory impressions that the experience will be enhanced; a combination of stimuli can reinforce and clarify the impression (Osvalder, 2012) and the more senses that consociate, the stronger the experience will be (Hultén 2014, referenced in Möller and Toma 2017).

The customer value

Since services often are consumed and produced together with the user, service-producers should focus on the user's current well-being (Hultén et al., 2011) which also applies to the washroom context. Hultén, Broweus and Van Dijk (2011) state that the users' well-being and sensory experiences to a great extent depend on the environment that they stay in, and that this is realized by more and more companies.

With the growing demands on companies' abilities to differentiate themselves on the market by providing experiences (Hultén 2014, referenced in Möller and Toma 2017) (see chapter *"8.3. The future of sensory marketing"*), a solution that enables multisensory experiences in the washroom is in line with what will continue to create value in the future. SoliQube is a means for companies to apply sensory strategies, which according to Hultén (2014, referenced in Möller and Toma 2017) enable the company to bring the user closer more easily and create a positive and multisensory brand experience, - if well thought out.

The effect of combining many sensory expressions is generation of user value, experiences and brand image which benefit both company and user. The user forms an opinion about the service environment or the brand when receiving sensory information in that service environment or for that brand (Hultén, 2014, referenced in Möller and Toma 2017), such as for the applied content to SoliQube in the washroom. Atmospheric conditions that elicit emotional affection of pleasure likely contribute to revisits, and effect how much money and time that is spent and can also lead to word-of-mouth being spread (Mossberg, 2015). Furthermore, memories are more likely to be stored in the brain when more senses are affected (Hultén 2014, referenced in Samuelsson 2016).

Ambient sound & background music

Ambient sound or background music is used to change the sound image in the washroom and to contribute to, and elicit, a private and safe experience of the visit. This is achieved through the consequential disguising effect on the natural sounds a visitor could want to mask. Further, the visitors feel private when experiencing sound isolation in the washroom; when not hearing sounds inside the SWR/cubicle from the outside, and from not hearing sounds in the basin room (or outside the SWR:s) from inside the SWR/cubicle (see *"10.2. The user needs"*). Although this can be achieved in various grades with added music/sound for different washroom layouts, background music and ambient sound nevertheless are expected to increase the users' private feeling based on the authors' own experiences from the tests with sound (see *"7.4.2. Quick testing of projection and sound"*). Thus, both music and ambient sound was experienced to contribute to an increased isolated feeling.

Another aspect is the atmosphere enhanced by the specific music or sound being used. As music can affect a person's mood (Yalch and Spangenberg 1988; 1990; 2000, referenced in Spangenberg et al. 2005), as for other sound (Hultén, 2013), it is important for the user experience of the washroom. According to Hultén (2013) sound has long been recognized to have positive effects on consumer mood, behaviour and preferences, where music in that regard is stated to be the "shorthand of emotions" in eliciting emotional responses. The atmosphere enhanced with the music can further clarify the identity and character of a brand in a service landscape (Hultén et al., 2011), and the music is also a valuable customer opportunity to influence mood and perception towards a brand (Hultén, 2013).

The point of entering

When opening the door and walking inside, the sound is fading in to waken a surprise but not startle the user. This way it moreover won't interfere with the music in the basin room or disturb the outside environment.

The point of leaving

When the visitor leaves the SWR the music or sound will fade out along with the projection to, again, not reveal the concept ahead and to not interfere with the outer environment. Moreover, it won't draw other visitors' attention when the music would spread from opening the door, which was found from the sound tests to cause an exposed feeling.

Exposure through the music or sound?

The sound functionality means that only the SWR:s being used will have music or sound turned on which could be reasoned to draw other visitors attention to it during the visit. From the sound tests in SWR:s (see chapter *"7.4.2. Quick testing of projection and sound"*), it was found uncomfortable to feel as though other visitors outside could hear the music/ambient sound coming from your SWR, however, on the outside it was difficult to distinguish the music/sound inside the SWR or where it came from, which decreased the feeling of exposure.

Added Scent

In general terms

Environments that are pleasantly scented elicit approach behaviours while unpleasant environments elicit avoidance behaviours (Bone and Ellen 1999, referenced in Spangenberg et al., 2005). This can be perceived as self-evident given the olfaction's potential to create moods, influence feeling states and evoke associations from memory (Bone and Jantrania 1992).

Scents are perceived to contribute to an atmospheric expression in a service landscape and elicit comfort and affective states that linger with the customer, moreover it can affect customer loyalty towards companies and be used to differentiate, position and strengthen a brand image (Hultén et al., 2011).

In the washroom

Apart from the artificial scent being a means to create an atmosphere and associations and thus contribute to the washroom experience, it was added to increase the likelihood of encountering a pleasant scent when the user enters the SWR/cubicle. This would in turn increase the user's well-being and possibly make him/her more comfortable with leaving the washroom, knowing that the added scent somewhat masks others smells.

The scent is chosen by the customer and the

intensity is automatically regulated to keep a constant level for a more pleasant experience. To use occasionally added fragrances only when there is a need to conceal particular smells would be more technically demanding and would not be sufficient to disguise bad smells completely without adding too intense scent, and was thereof disregarded.

Sound & scent - variations by layout

Washroom with SWR:s

From the tests with sound (for method see chapter *"7.4.2. Quick testing of projection and sound"*) it was found that a washroom consisting of a basin room and SWR:s should preferably have music in the basin room as well as ambient sound or music in each of the washrooms; it sets the visitor in a mood as soon as s/he enters the room and it enhances the user's experience when standing in line or washing the hands. Also, the visitors inside the SWR:s hear less noise from other visitors in the basin room when there is music outside, which is positive for feeling private. The music in the basin room also disguises the sounds from inside the SWR:s so that the concept won't be revealed to the visitors outside. It is essential that the music however in the basin room won't disturb the atmosphere in the SWR:s through the type of music or the volume.

Mossberg (2015), states that scents have demonstrated to have an effect on visitors to shops where scents have been found to affect the visitors' time perception when standing in line. Music has also been found to affect time perception (e.g., Yalch and Spangenberg 1988, referenced in Spangenberg et al., 2005), and if this applies in washrooms too, music and scent could affect the user experience positively if the user would stand in line and wait to visit the washroom, which would reflect more positively on the customer.

SWR without basin room

The difference with SWR:s without a basin room is that sound will be used only inside the SWR:s as they adjoin to another environment that could have completely different demands and usage where background music is not suitable.

Washroom with cubicles

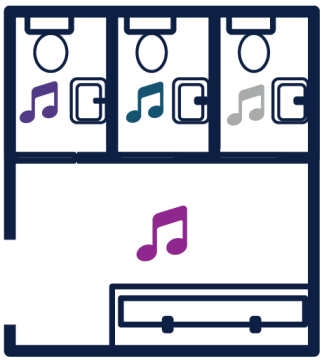


Fig 64. Type of sounds in Washroom with SWR:s

Fig 65. Type of sounds in SWR:s

Fig 66. Type of sounds in Washrooms with cubicles

In a cubicle washroom, the soundscape is completely different. Here all sounds travel in the room which is why the loudspeakers in each cubicle will play the same music or sound in sync. The music or sound is playing constantly in the washroom. Added scents will also spread in the room and must therefore be the same.

It is essential that the volume and scent intensity is carefully adjusted to fit every specific washroom so that there will be a pleasant experience both inside and outside the cubicles.

The differences

These differences between washroom layouts mean that you can show different themes and use different sounds and scents in SWR:s, but that the sound and scent must be the same for all visitors in a cubicle washroom.

Image & video

Image and video constitute the visual impressions of SoliQube and aims at conveying a message and/or elicit an emotion. Foremost THEME is believed to affect the spatial experience of the washroom.

Digital material

Using projection onto the door creates endless opportunities to display digital content; still images or animations together with sound. It is an efficient way for customers to easily launch new content and a way to reach specific visitors locally, further, it is a means to create an atmosphere after interest. With relatively little time and effort it is possible to change theme and information in the washroom and create different multisensory experiences after need.

Image placement on door

The placement on the door is a natural framing for most cubicles or SWR:s where the door is opposite the toilet seat. It will be noticed instantly when the visitor is facing the door to lock it, and it is the placement where the most users can focus their attention on it for the longest time during the visit; being when sitting down on the toilet seat and carrying out their needs. The image is projected from a short range above the door so that nothing will obscure the projection/casted light.

Fig 67. A short-range projector that can be mounted in the ceiling.

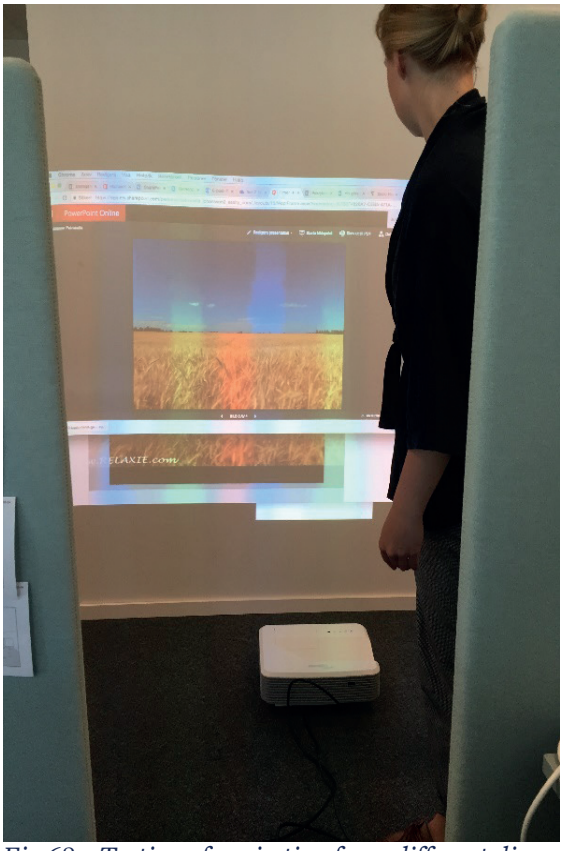


Fig 68. Testing of projection from different distances.

Projection

The choice to use projection was based on the predominant benefits in the washroom context, primarily concerning the implementation feasibility as the product would be mounted in the ceiling and not attached or built into the door, meaning that varying durability and construction of doors can be disregarded. Another benefit is that the image placement and size is adjustable and flexible; with projection, the concept could display content on varying surfaces of different size. On the other hand, projection has less reliable image quality than screens due to the impact of the projection surface properties and the ambient lighting. There is also a risk that a projector could be noisy and generate heat although this today varies greatly (Hammarbäck, 2018). Despite this, projection was regarded a good option considering the ongoing development in the area where projectors are becoming smaller and more efficient products. Also, as described in *"2. Purpose & Aim"*, the concept aims at being futuristic and not realisable at this moment of writing.

+ Pros with projection

- No need to mount a product or build in a product onto the door
  - don't need to regard the durability aspect or the impacts from slamming doors
- Hygiene: There will be no additional edges where dirt can accumulate or surfaces to keep clean where people may touch the product.
  The solution is anticipated to be experienced as hygienic
- The product will less likely be damaged if mounted in the ceiling instead of on the door as it then is more inaccessible
- The product is out of sight to the user when not being on which means that it doesn't disturb the impression when not being on
- The product itself could be one single module in the ceiling
- It is easier to plug in a projector positioned in the roof than a product on the door as the door opens and closes. Also, there are often cables in the ceiling already for the lighting
- Projection means adjustable and flexible image placement, it is easier to change image placement than with built-in products
- No measurement order after door proportion and size is needed

− Cons with projection

- The projector-fan could be noisy but varies greatly from projector to projector
- Inexpensive and small projectors can be quite loud. Larger, more expensive projectors have designs that minimize their noise and can be very quiet
- Could generate heat in the washroom
- Less reliable image quality due to impact of projection surface properties and ambient lighting
- Maintenance: the lamp must be replaced and the projector cleaned from dust
- Requires bright colored, but most often white, projection surfaces.

Fig 69. Pros and Cons with projection.

Image size and placement

Different image sizes and placements on the washroom door were tested by the authors with a simple projector inside a SWR and a mock-up of a cubicle at SCA. What could be concluded was that it partly depends on what is shown; if showing a nature scene, it is preferable that it is large to be striking and to give the feeling of looking out through a window. If an illustrative ad with/or a text message is shown however, it should be smaller in size not to be experienced as intrusive and to be overview-able for comfortable reading.

It was found that the distance from the toilet seat to the door also mattered. The closer to the door the smaller the image should and could be as the viewing angle reduces. Through tests with different image sizes that varied in resolution it was also concluded that a good resolution of the image was more important than a large image size for the experience; an informative image with poor focus that contained text was experienced as annoying, and a scene suitable to the THEME execution was not experienced as credible if having poor focus.

Regarding the THEME execution, we found that images with a horizon was preferable so that you could orient yourself after the scene. A scene with a horizon also had a clearer depth which also contributed to a more credible experience, - meaning, feeling as though looking out through a window.

In both cases the image shall be placed with the centre in the height of the eyes of a sitting person, then it felt comfortable to look at it both while sitting and standing up.

Growing image when entering

The image is gradually growing when closing the door into the full-scale size as a dynamic effect and to inform the user that something is happening. The motion draws the user's attention from the handle when locking the door, and when the image is remaining still in full-scale it informs the user that it is "done".

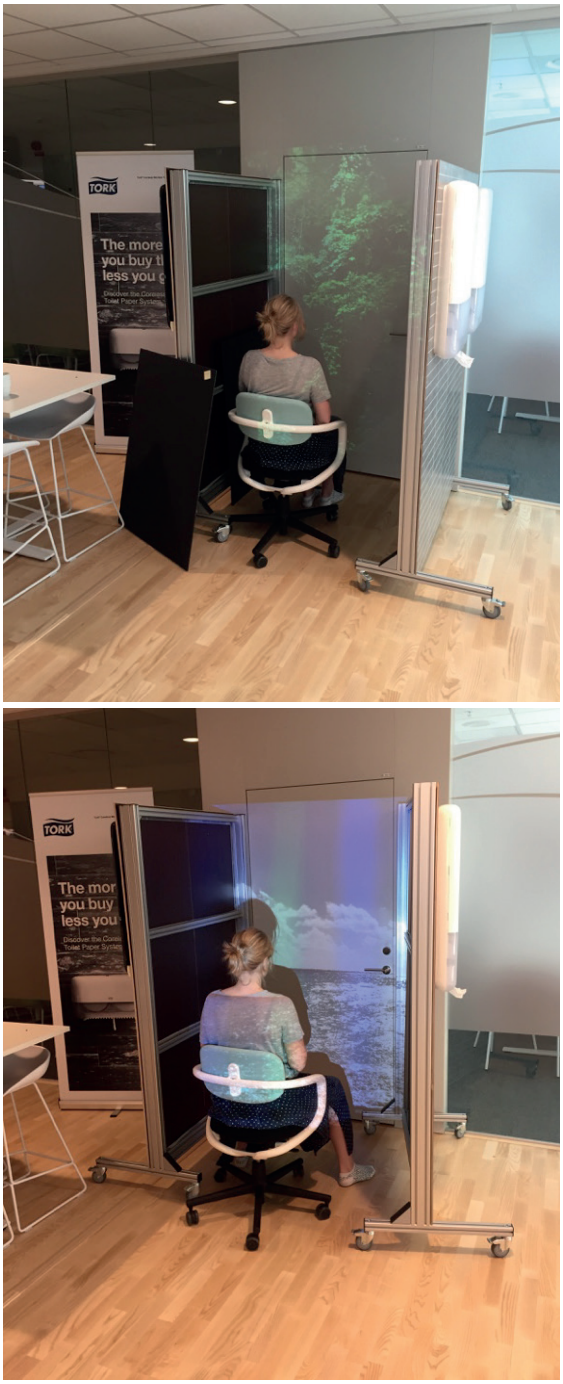


Fig 70. Testing was made in a mock-up of a cubicle to evaluate distances and placement of different images.

The point of leaving

When the visitor leaves the SWR the projection will fade out along with the music or sound to not reveal the concept ahead to other visitors outside, and to not disturb the outer environment.

Lightning

THEME vs. INFO

The ambient lightning differs for the INFO and THEME executions. For the THEME execution, it was tested to dim the light somewhat in the washroom together with a nature scene projection. This put the image more in focus and of course improved the image quality, but it also amplified the isolated and relaxed feeling. It was also tested to alter the colour of the ambient light to match the nature image, and it reinforced the feeling of looking out at the scene through a window; the scene was reinforced through the reflected coloured light. The colour should therefore match the image and is foremost effectual when having a THEME.

Different lighting conditions were also tested together with an ad suitable to the INFO execution, and the dimmed and colour-shifted lighting was deemed excessive for the purpose of INFO.

Cubicle vs. SWR

When using THEME in SWR:s, the light level is initially bright so that the users can see the state and cleanliness of the washroom as we found that this was something of interest (see chapter *"10.2. The user needs"*). The ambient light should then shift in intensity and desired colour in sync with when the user closes the door and the image is enlarged to better frame the projection and set a mood. When using INFO in SWR:s the ambient lighting is yet bright and constant. In cubicle washrooms, the ambient light should be constant, dimmed or bright, to not give a cluttered impression from constantly shifting lights.

Masking sound

By having the option to use added masking sounds in the SWR/cubicle, the masking effect is presumed to decrease the exposed and anxious feelings that could be awakened when one's natural sounds are overheard.

A short masking sound is being activated with gesture control (see chapter *"17. SoliQube – The interaction"*) and is played in the specific SWR or Cubicle on top of the background music or ambient sound. The masking sounds should not be distinguishable as a masking sound, but should blend into the soundstage not to expose the visitor's activities.

Fig 71. Testing of lightning conditions were made together with different content.

From the tests with sound it was found that occasional masking sounds were not essential in SWR:s with ambient sound or background music, as this alone was disguising in a room that was already somewhat sound proof. The added masking sound was however experienced, by the authors, to contribute to an additional safe and isolated feeling.

From the authors' experience of the sound tests it was also found that there was a greater need of masking sound in a cubicle washroom due to the acoustics. Despite this, the authors wanted to evaluate how users would experience having the control of an added masking sound in the washroom, - although the user tests of SoliQube were carried out in a SWR and not in a cubicle washroom (see the test procedure in *"7.4.6. Design of INFO and THEME test"*)

Sleep mode

When the SWR:s have not been used for some while they will become quiet and blackened in sleep-mode to save energy (both lighting and projection). In cubicles, the projection will go into sleep-mode but the music/sound and lighting will be constantly on.

User control

Mossberg (2015), uses the term "experience room" for the physical environment in which the experience is created and consumed. What a person feels towards the "experience room" is affected by the person's acquired mood from before; a sad and tired person could think that much stimuli are unbearable while s/he could appreciate the visit if being in a good mood and with friends. The "experience room" could also affect the visitor physically where high volumes could cause head ache, and scents nausea (Mossberg, 2015). Although this shows that SoliQube should be able to be shut off by the user to not risk causing a negative experience, a washroom visit normally doesn't last for long which makes it feasible to use much stimulus in it. However, the concept execution, the stimuli intensity and content, should be designed with care to avoid negative physical reactions.

15.1.2. Content

The development of SoliQube focused on the concept principles and usage. The question of what specific content and how the content should be used in more detail is not covered in this project but lies in future development (see chapter *"ENDING"*) Presented in this chapter is hence basic arguments of what types of content that should be used and how they should be combined, underpinned with the identified user and customer needs, literature studies and tests with image and sound.

Context-congruent content

The multisensory experience is shaped by the content used in SoliQube. If successful, SoliQube creates an atmosphere in the washroom that has an impact on the user, and it is then important that the effect on the user is deemed suitable and congruent with the context and the surrounding environment that the washroom, and hence the user, is in. The washroom is after all a part of the main context where the washroom experience is one part of the holistic user experience. For the washroom to be evaluated positively and enhance the overall user experience of the main context, it is important to know what expectations the user has on different kinds of environments, business areas and the specific main context, to be able to accommodate these.

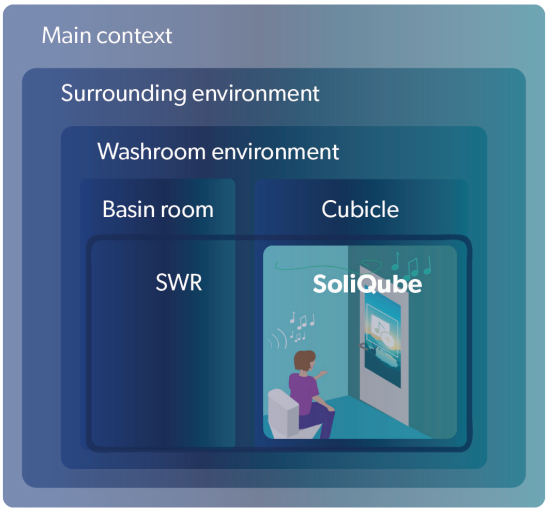


Fig 72. Context-congruent content in several dimensions.

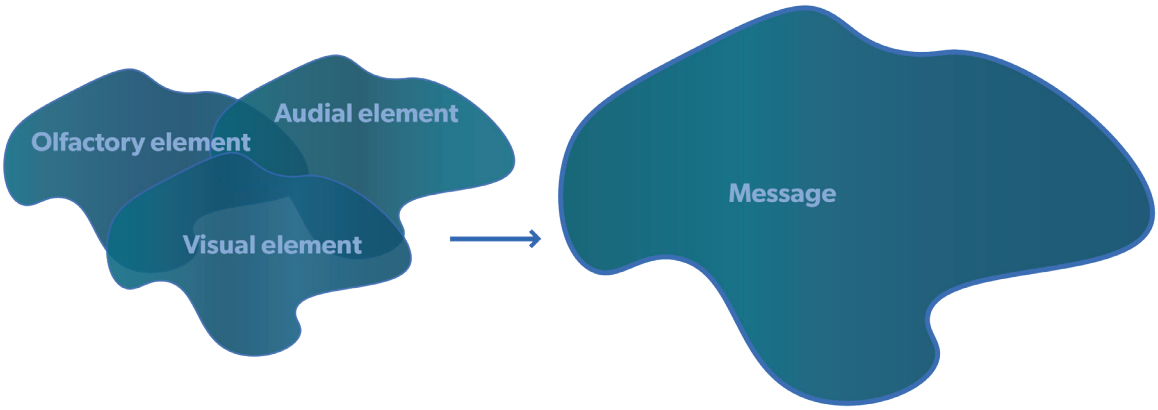


Fig 73. Congruent elements in SoliQube result in clearer message and stronger experience.

Cross modal correspondence of the elements

INFO is using a still image or a discrete film with modest animations/motions that shows a message together with music and ambient scent of the customer's choice. To reach the best possible effect, the image, scent and music should be congruent and convey the same message (see chapter *"5. Theoretical framework"*) For the INFO execution, the masking sound ought to blend into the natural sound stage of the washroom yet not expose the user's intention to disguise his/her own sounds. Possible masking sounds could therefore mimic washroom sounds such as flush sounds and rattling paper dispensers. The credibility of the artificial sound concerns the audial similarity and volume of the sound.

The THEME execution is based on the fact that a still film of a scene is used together with associated natural sound from the scene and suitable ambient scent so that a compatibility effect between the stimuli dimensions could be reached in the different sensory modalities, and hence elicit a unified and lifelike impression. The masking sound should further fit with the used scene so that it is experienced as a sound naturally coming from the theme environment, and the ambient light should be tinted in a colour that matches the projected scene. The THEME execution is expected to elicit a more pleasant and positive user experience than INFO in the washroom because of this.

These elements are decided by the customers, which suggests that they either are responsible for the execution/design strategy themselves or provided a service. How such a potential service would be designed is not covered in this project.

Intrusive sensory impressions

Projection

It is important that the washroom is not experienced as intrusive by the user. The projected image draws the user's attention through its placement and through its salient properties, such as its size and colours etc. and because it is something new (see theory in chapter *"5.3. Attention"*). If a video or moving images would be used, the users would be likely to direct their attention to it for a longer period of time than for a still image, as the motion and the displayed new stimuli would capture the user's attention. A still image on the other hand is accustomed to faster as it is constant visual stimuli. For that reason, it is unpractical to show moving content, as for a video with a story line, because of the new stimuli that can result in the user staying longer in the washroom.

If the user dislikes or has no interest in the content being shown, or has motives with the washroom visit that contradicts with being exposed to visual stimuli; s/he could want to shut out the visual information which is more difficult with intense stimuli. This could consequently result in the user feeling distracted and annoyed and could thus affect the experience negatively. Animations should furthermore be used with care not to cause disorientation or nausea in the washroom.

Audition

The auditory sense is constantly active and cannot be turned off and the sounds that are perceived as meaningful are the ones that a person listens to (Hultén, 2011). If using audial messages in the washroom it will most probably be perceived as important and would make the visitor listen to what is being played, but it will also be difficult for a person to avoid hearing and listening to what is being communicated unlike a visually communicated message. For this reason, audial messages were deemed intrusive to the user in a washroom and not suitable for the concept.

Scent & sound

Furthermore, both artificial scent and volume of music/ambient sound must not be experienced as too intense and high as this also would be experienced as negative and intrusive, although the level differ from one person to the other.

Ambient scent

The olfaction is important for the human's experiences, memories and well-being, and scents further affect mood and psychological state (Hultén, 2011). How the olfaction is connected to the human's experiences and emotions is described in chapter "*5.4. The human senses*"

The washroom can be seen as a service-environment since it is a service provided to the users in a main context. Hultén (2014, referenced in Samuelsson 2016) states that the importance of scent in a service-environment can be divided into congruence, presence and likeability.

First, the presence of a scent, that is intentional and selected for the specific service-environment, has a greater impact on the customer than an unintentional scent. It is central that the selected scent is congruent with the service-environment per say, meaning that it should accord with the customers' expectations as well as the concept of the environment (Hultén, 2014, referenced in Samuelsson 2016). Hultén (2014, referenced in Samuelsson 2016) further stresses the importance of achieving this for service environments like washrooms, that are adjoining areas to another main context or main service environment, as it could enhance the overall customer experience.

Spangenberg, Grohmann and Sprott (2005) researched the effect of ambient cues in a retail setting on the consumers' evaluation of the store and its environment. They stated that it is crucial that the olfactory cues are both experienced as pleasant and congruent with other components of the environment; thus, if a scent is objectively judged as pleasant but not contextually congruent it could result in counterproductive customer evaluations. For this project and the final concept SoliQube, it means that the scent ought to "fit" with the washroom context and the main context.

The human nose remembers ten thousand scents (Hultén et al., 2011) but humans have difficulties with describing them and are not always aware of what something smells like or that it smells at all (Nordfält 2007, referenced in Samuelsson 2016). Cross-modal correspondence such as using congruent music with the ambient scent will facilitate the customers' identification of the scent, and thus result in greater accessibility of feelings, thoughts and emotions related to that scent (Mitchell, Kahn and Knasko, 1995). Therefore, cross modal correspondence between ambient scent and audial and visual stimuli should be achieved for INFO and THEME.

Whether a person likes a scent or not depends on the factors pleasantness, familiarity and intensity. Pleasant scents are frequently perceived as familiar, and familiar scents are usually better liked than unfamiliar scents, thus pleasantness and familiarity are positively correlated (Herz, 2010). Scents that are perceived as pleasant often elicit positive emotions while the opposite regards scents perceived as unpleasant (Hultén, 2014, referenced in Samuelsson, 2016). The correlation of scent intensity and liking is more complex where there either exist an inverted-U or linear function; the liking increases with the intensity up to a point upon which it then starts to decrease, or the scent is initially acceptable but is steadily judged as more disagreeable as the scent becomes steadily stronger (Herz, 2010). Hence, the intensity should match the particular scent being used in INFO and THEME.

Another aspect strongly affecting scent preferences (Hultén et al., 2011) and influencing

perception of scents (Lwin and Wijaya, 2010) is culture, suggesting that scent associations across cultures should be regarded. In a study, scent-attribute association among different cultures was explored and the universality of scent preferences in different contexts was examined. From this study, it was found that scents associated with "a clean place" across cultures were often citrus scents such as lime, lemon, grapefruit and orange, "nature smells", "airy smells", "fresh air", "mountain breeze and ocean breeze", detergents, chlorides and air fresheners. Scents associated with "an unclean place" were garbage, the concept of smells emitting from undesirable items of discard, smell from spoiled food and staleness of air (Lwin and Wijaya, 2010).

Several experiments have demonstrated that memories associated to odours are more emotional than memories associated to cues of other stimuli modalities (Herz, 2004). Both the fact that there, during recollection, exist a privileged relationship between olfaction and emotion and that prior experiences is a primary influence in (autobiographical) memory (Herz, 2004), suggest that scents that the users themselves have experienced before should preferably be used in SoliQube to evoke emotional associations. Also, scents associated to the childhood is often considered to be the most emotional (Hultén et al., 2011).

Ambient sound and music

From the quick tests with sound it was found that it is essential that the ambient sound has a character that disguises natural washroom sounds, and is experienced neither as unpredictable, nor startling or monotone. It could also be concluded that a positive experience with the music in the washroom resulted when the music's valence was positive and when it was experienced as masking but not exposing. The music valence is individual and refers to how positive or negative the music is experienced as (Hultén, 2014, referenced in Samuelsson 2016), and the experienced masking effect could result both from the music's characteristics and volume.

Hultén et al. (2011) state that the music elicits feelings and thoughts through its associative effect and hence has a great impact on the listeners. For this reason, it is essential that the sound is perceived as pleasant. For the customer, this means that the music should be chosen with consideration so that the atmosphere created with the music appeal to the target group.

Musical cues and other marketing stimuli affect arousal states and derived meaning if congruent (Spangenberg et al., 2005), which strengthens that homogenous information, as for the music, image and scent, should be communicated in INFO as stated above (see Cross modal correspondence of the elements).

The effect of choosing the "right kind of music" could be that the user stays longer in the service environment and is keener to recommend it to others and spread a good word about the brand. The tempo of the music could also affect the user behaviour, proven in a restaurant study where a high tempo made the visitors leave the tables faster and opposite for music with low tempo (Hultén et al., 2011). Music with a high tempo tends to elicit more joy than low tempo-music (Hultén, 2014, referenced in Möller and Toma, 2017), whereas low tempo-music make the listener perceive waiting times as shorter due to the emotional response it elicits. However, both music with a high and a low tempo affect the listener's well-being and the perceived service positively. The company, being the customer, needs to adapt the tempo of the music to the surroundings (Soars, 2009, referenced in Möller and Toma, 2017) and use music that correspond with the expectations and the degree of arousal that the brand ought to communicate through its identity (Hultén et al., 2011).

Nature theme

The THEME version of a nature scene presented in *"14. The Experience"* is an execution-option deemed to have a calming and relaxing effect on the user and to contribute to a pleasant visitor experience. Humans find nature universally pleasing regardless of age or culture; only viewing scenes of nature reduces stress, anger, and fear and increases pleasant feelings. Exposure time of nature scenes are associated with psychological well-being, positive mood, meaningfulness and vitality (Larson and Kreitzer, 2016).

Another effect of viewing nature scenes is the increase in human ability to pay attention because of humans' natural behaviour to focus

on what they are experiencing out in nature, and hence provides a respite for the mind. Research in hospitals have showed that nature scenes have a soothing effect, and affect patient recovery positively. A view of an open landscape is hypothesized by some researchers to be inherently interesting and make humans feel comfortable (where the opposite could be a forest where predators could be hiding) (ibid).

Type of message in INFO

What type of message that should be used in SoliQube is anticipated to vary depending on the business area and context, the purpose of the user's visit, the standard of the washroom and the customer needs. Regardless of variations, the conveyed message should be deemed "appropriate" regarding these aspects (Mossberg, 2015). Advertisement with the purpose of "selling something" could cause annoyance for the users who see the washroom visit as a break and a moment of alone-time as it risks being experienced as intrusive (see *"10.2. The user needs"*). Numerous studies show that attitude towards the advertising depends on attitudes toward advertising in general apart from the ad credibility, ad perception, attitude toward the advertiser and mood (MacKenzie and Lutz, 1989). The possibilities to convey information and messages in the setting of SoliQube are deemed to be many. The effect on the user, how the users would experience being targets to different types of information and what is experienced as appropriate and not in the washroom setting was somewhat found in the user test, but requires further research (see *"ENDING"*).

15.2. Evaluation

In this chapter, the evaluation of *SoliQube – The impression* is presented, in the execution of INFO and THEME. The concept was evaluated with user tests carried out at Essity (for method see chapter *"7.4.6. Design of INFO and THEME test"*) that aimed at evaluating the principle of the concept in terms of the users' experiences and impressions of it, to further be able to state what is successful and unsuccessful in regards of achieving the overall desired effect – a better user experience and increased communication values in the washroom.

The functional model of INFO and THEME used in the tests are initially described in the chapter, followed by the result and analysis respectively of the concept's emotional effect, semantic impressions and containing elements. The result of the evaluation in full is presented in appendix 13, *Evaluation of SoliQube - The Impression*.

Test execution of INFO & THEME

As described in the project execution (see *"7.4. Phase D - Overall Design"*, SoliQube – The Impression was tested separately from SoliQube – The interaction. The participants in the user tests got to use a SWR with either a functional model of the INFO execution or the THEME execution of SoliQube. Both projection and sound/music deviated from the intended usage by already being turned on before the user enters the door. The two test executions are described below.

INFO

The image used in INFO was an old poster from the Essity intranet of an upcoming event at the office building with Stena Line (Fig 74). It was chosen because it had a connection to the workplace in which the user tests were carried out, and since it possibly was relevant information to the participants, who were Essity employees. It was also chosen because it contained both text message and pictures, and because it advertised edible and potable items, - coffee and ice cream, that was deemed interesting to include.

The image was combined with music in the funk/pop genre that aimed at eliciting a cheerful and happy mood, which seemed suitable with the positive message of free ice cream and coffee. The fruity cherry fragrance aimed at corresponding with the main colours used in the ad. The masking sound used was the sound of a toilet flush.

Fig 74. The image used for the INFO-test

THEME

The still video used in THEME was a close-up nature scene of a water stream in the mountains with the associated sound of purging water and bird song. The purging water sound was an interesting feature in terms of the possible stimulating effect on the users, and overall the nature sounds was considered pleasant and disguising as desired. A pine scent was used, and the lighting was dimmed and shifted in blue to match the blue mountains and the sky. The masking sound used was a sound from a frog that resembled the sound of a woodpecker.

Fig 75. The video used for the THEME-test

15.2.1. Emotional effect

The users' affective reaction, the pleasure, arousal and dominance, associated with the SoliQube – INFO and THEME washroom, measured with a self-assessment manikin (SAM) (See chapter *"7.4.6. Design of INFO and THEME test"*), is presented in this chapter. The results in full can be found in appendix 13.7, *Emotional effect*.

Positive/negative

THEME had the median ranking 1 while INFO had 2 on the valence-scale (see Fig 76), which supports the notion that the THEME execution was experienced more positively than INFO.

Unitary experience resulted in stronger experience

It was clear that THEME had a greater impact on the participants due to the more congruent sensory impressions and thus resulted in the participants experiencing a more distinct concept. Often, all impressions were mentioned as a whole when the participants reasoned about why THEME was a positive washroom experience, while there more often was solely one element being mentioned to elicit the positive/negative affect for INFO.

Using a video of a real scene with associated sound and scent was self-evidently, and as expected, experienced as more congruent and uniform than an ad with suitable music and scent; the cross-modal correspondence of the stimuli from the nature scene is underlying by the user's previous knowledge of the world.

THEME: "Very positive both smell and visually, and the whole atmosphere was relaxing. It felt as though it was a good place to be compared to other washrooms that you just want to leave. So very positive I think"

Elicited associations and a shielded feeling

Not surprisingly, THEME also gave rise to more associations to other places and activities, which was experienced as positive by the participants because the theme, and the nature sound specifically, gave rise to positive associations to nature. The dimmed light in THEME also contributed to the feeling of being on your own. Yet it was also mentioned that the music in the INFO washroom created a pleasant setting and contributed to the feeling of being in a private room. Experiences in the washrooms that made the participants feel shielded from the outside world, hence feeling more private, was thus experienced as positive, which is in line with previous findings from the interviews (see chapter *"10.2. The user needs"*).

THEME: "Surprised, amazed (the first impression). The blue light (was noticed first). It gives you the feeling of relaxing mode. And the voice of the birds gave me the feeling of walking in the woods"

THEME: "It was good. You got the impression that you were sitting on a pier on some kind of outhouse because of the water and the birdsong"

INFO: "Like being in my own little world".

THEME: "It was dimmed,..and discretely shielded. You felt that "here you can be on your own"

Stimuli intensity

In INFO, the scent intensity fluctuated (discussed in *"21. Discussion of process and methodology"*) which in some occasions resulted in a strong scent that affected the user's experience drastically and negatively. Some participants experienced the music to be higher than preferred which also had a negative effect on the experience. This stresses the importance of suitable stimuli intensity in the concept (see *"15.1.2. Content"*).

Individual preference

Apart from the importance of adjusting sensory stimuli to a suitable level, the liking of the stimuli plays a significant role. It was evident in INFO that the liking of the music, scent and message being used, could contribute to a stronger and more positive user experience than when eliciting a neutral (or negative) affective reaction. The nature theme was appreciated by all participants which could depend on its hedonic appreciation (Larson and Kreitzer, 2018). This is further treated in chapter *"15.2.3. Opinions on concept executions"*

The expressions of INFO and THEME were quite different where the music in INFO conveyed a cheerful and more aroused mood. Depending on the user's temporal motives for the washroom visit and current mood, it is possible that one execution could be prefer-

red at one occasion but not in the next. One of the participants for example stated that she would have liked calmer music to make her calmer in the INFO washroom. The preference is however strongly linked to the business area and context in which the washroom is used. A washroom user might for example expect and want one thing from the washrooms in a (specific type of) restaurant environment, and another at the office building. (see chapter *"11.1. Business characteristics affecting the needs"*.

INFO: "Well I liked to go in there, I like when it smells when you walk in, that the scent was planted there, it feels a bit fresh when you come in. The music was good but maybe other kind of music; it was not quite my favourite but I get the point with it. I also liked the projector"

First impression of THEME: "Surprised. But very harmonious. It was very calm and good"

Intrusive sensory impression

The execution of the test-rig itself contributed to an initial negative experience for two of the participants in the INFO washroom who believed that the projector fan was disturbing. For the THEME washroom however, no one remarked on the noise from the fan although this was identical. This could mean that the noise wasn't noticed by the participants in the THEME tests, or that it didn't affect the experience of the particular THEME execution, this can however only be speculated.

INFO: "I was a bit startled at first, I thought it was annoying with a loud fan at the entrance".

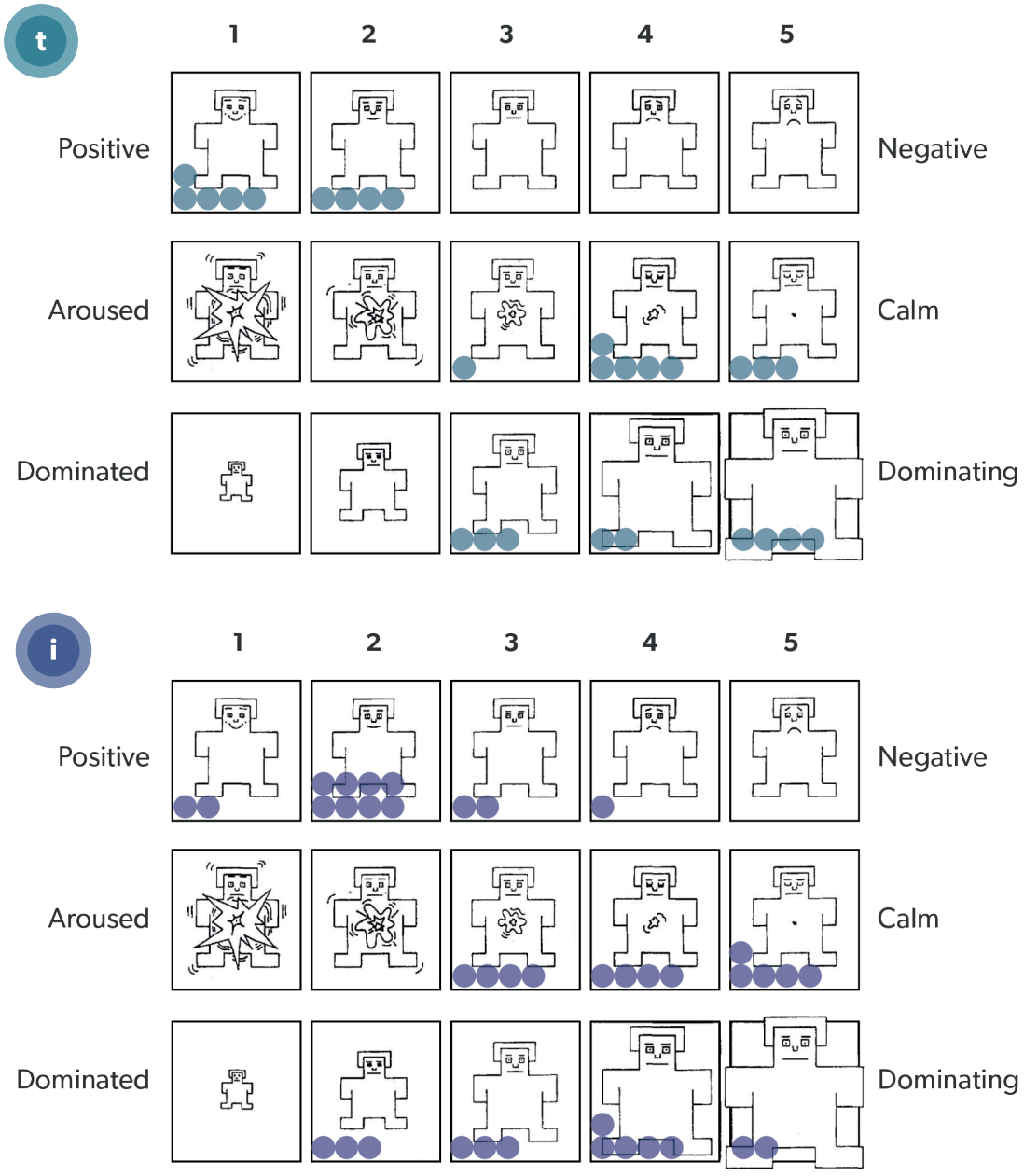


Fig 76. The Self Assessment Manequin result. THEME on the top and INFO at the bottom.

Surprise effect

Four out of nine participants answered that they were surprised as a first impression of the THEME washroom, and this answer corresponded to two out of thirteen for INFO. The surprise reaction is related to the participants' expectations and how alike or different these are to the real scenario. Surprising the user by providing an unexpected washroom experience was a desired effect, and the surprise reactions are predicted to be greater with the intended design of the user entrance (see chapter "*15.1.1. The usage*"). It is likely that THEME elicited more surprise reactions because it deviated more from the original washroom that the participants were acquainted with from before.

INFO: "I was very surprised, you opened the door, because you heard nothing from the outside, that music was playing, and the light was already on, so it was like "oh!". But once the surprise had subsided it was mostly positive"

Atmosphere affected behaviour

Both INFO and THEME had the effect that three participants stayed longer in the washroom because of the pleasant atmosphere. This behaviour and wish to linger in the washroom was found in the user studies (see "*10.1. The user situation*") to mark a good washroom experience. But as mentioned, lingering people could be problematic due to efficiency. What speaks against that this behaviour could be problematic is that washroom visitors normally are aware of when there is high pressure on the washroom even before their own visit, and thus normally try to be considerate to other visitors. This manner probably stands above the influence of music and scent on the users' time perception (see theory in "*15.1.1. The usage*"), and will likely not make them forget about time inside the SWR or cubicle. However, if this would be the case, the concept could be deliberately designed to avoid this behaviour when not suitable to the context.

Calm/aroused

Both INFO and THEME had the median 4 on the aroused/calm-scale (see Fig 76) although this was manifested in different ways. Initial negative impressions, the effect of the music in both calm and aroused remarks, and overstepped thresholds of stimuli intensity, were observed to affect the calmness/arousal reactions to INFO. Despite these reports it was overall few things that affected the participants' calmness/arousal during the washroom visit that could be tied to the actual INFO execution; thus, many felt as calm as they normally do in a washroom. Further, a difference regarding how the participants expressed themselves for the two executions demonstrated that the effect was greater for THEME; only one in the THEME washroom said that she felt as calm as she normally does, the rest said that they became calmer due to the relaxing atmosphere, which is 8 out of 9 persons.

Dominated/dominating

Since more participants experienced dissatisfaction with some aspect of the INFO execution than in the THEME execution; aspects existed that the participants would have wanted to be different, hence aspects that they would want to change but being unable to. This contributed moderately to the slightly less dominating feeling of INFO (median 3,5) than THEME (median 4).

Also, when lacking feeling of control, it is connected to not feeling dominating and could result in a negative experience, which was the case when a participant became startled or felt concerned due to uncertainty about how something ought to work in INFO.

15.2.2. The semantic impressions of INFO and THEME

A semantic differential scale (see chapter *"7.4.6. Design of INFO and THEME test"*) was used to map out the participants' opinions, attitudes and values associated to the INFO and THEME washrooms. A compilation of the mean value of INFO and THEME is shown in Fig 77 followed by the mean and median value respectively for both executions (Fig 78 and Fig 79). A summary of the results is presented in this chapter where the results in full can be found in appendix 13.5, *Semantic differential for INFO & THEME.*

Semantic expression overall

The compilation of the experienced semantic expressions of the INFO and THEME executions show that they overall were perceived as inoffensive, modern, hygienic, suitable/appropriate, premium, secure, harmonious and isolated/protected. Further they were perceived as private and to leave a lasting impression. This is a positive result and shows that the concept has potential. The participants got all desired impressions of the two executions in varying degrees; THEME was perceived as more premium, more stimulating, more surprising and slightly more modern than INFO.

Isolated/Protected-Exposed

It was evident that the room itself of the SWR was most crucial for the protected and isolated feeling, likely because it has a great impact on the visual, spatial and audial experience of the visit. Music or ambient sound, as well as dimmed light could contribute to the isolated/protected effect of the SWR. Although the sound inside the SWR could be experienced as attention-catching and thereof exposing, it was nevertheless deemed positive with music or ambient sound in the washroom. When using technical gadgets in the washroom it is important that these are experienced as harmless and trustworthy, to not elicit an exposed feeling.

Private-Public

Very few, if any, persons have nature sounds and a large image of a nature scene in their washrooms at home, still the THEME washroom was experienced as more private than

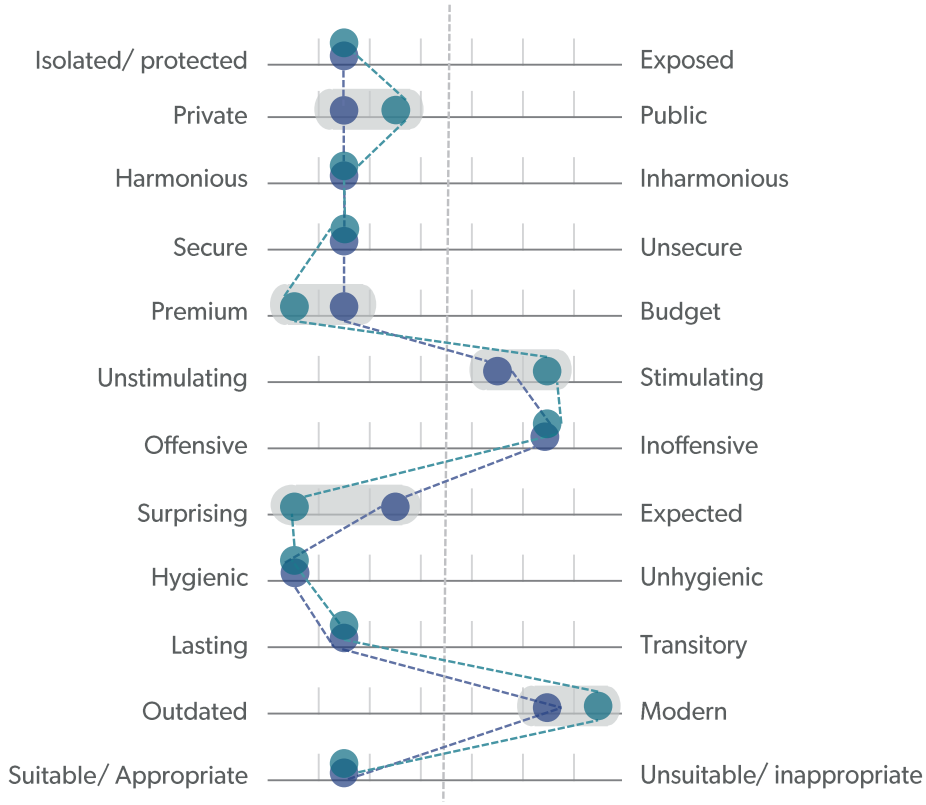


Fig 77. The semantic differential scale presenting the mean value of the INFO and THEME executions in the tests.

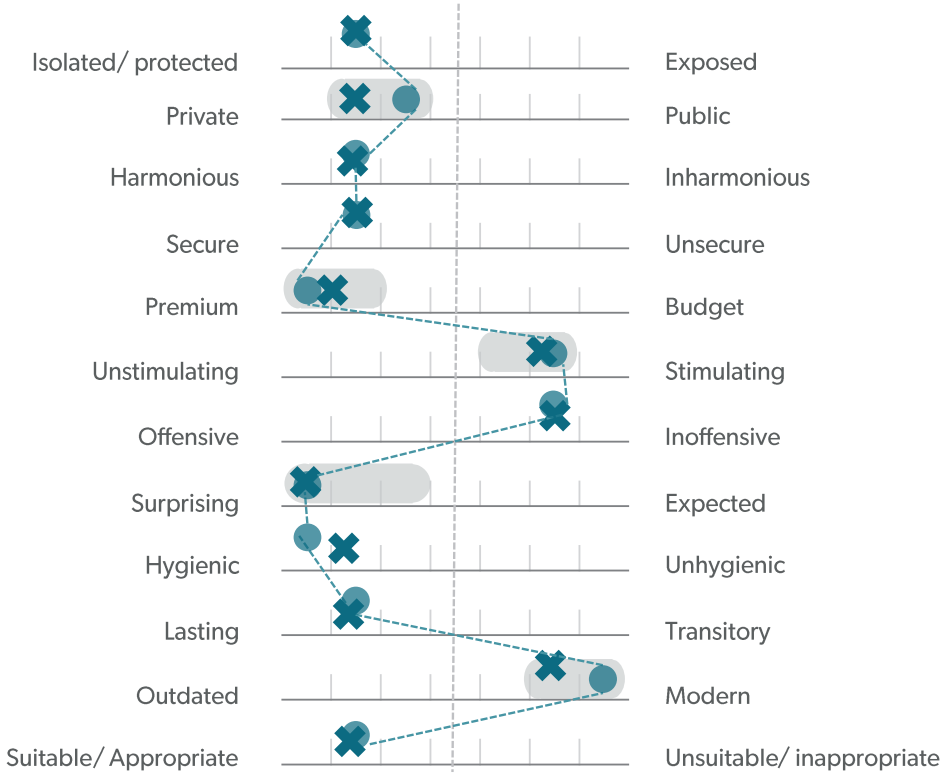


Fig 78. The mean (O) and median (X) values represents the participants' impressions from the THEME execution.

public, as for the INFO execution. The private feeling elicited in the washroom - that the user feels isolated and by her/himself - make the user experience it as more private than public, although it doesn't resemble a typical private washroom. Eliciting the user's feeling of being on his/her own and making the user not think of other users during the visit, goes hand in hand with increasing the feeling of being in a private washroom, Also, the less the user thinks of other people during the visit, the more it feels like a private washroom.

One can create a more private washroom feeling by choosing a scent that's not associated with public washroom scents, but associated to private washrooms. Ads and a "too perfect" washroom can also result in a more public feeling.

INFO:" Yes I actually felt that even though I wasn't at home it felt as though it was for me when I was there"

INFO:" Private. But it is too perfect to be a private washroom"

INFO: "[...] it's not exactly like being at someone's home but you are more private (than at other public washrooms)"

THEME: "At home you might have a more personal washroom and this felt more like that. Maybe like you were in somebody's home"

Harmonious - Inharmonious

The THEME washroom was experienced as more harmonious than the INFO washroom. Fewer things were noted as disturbing with the THEME washroom and to a milder degree disturbing, which had a connection to the higher rate. Also, the relaxing atmosphere and the holistic experience of the THEME washroom resulted in a more harmonious impression. Thus, stimuli intensity and congruence affected the harmonious/inharmonious impression.

THEME: " Harmonious, that goes without saying with the nature music and some peace and quiet in there, clearly"

THEME: " Very harmonious. When many senses are involved to give one impression which is predominantly positive. So, it feels just good"

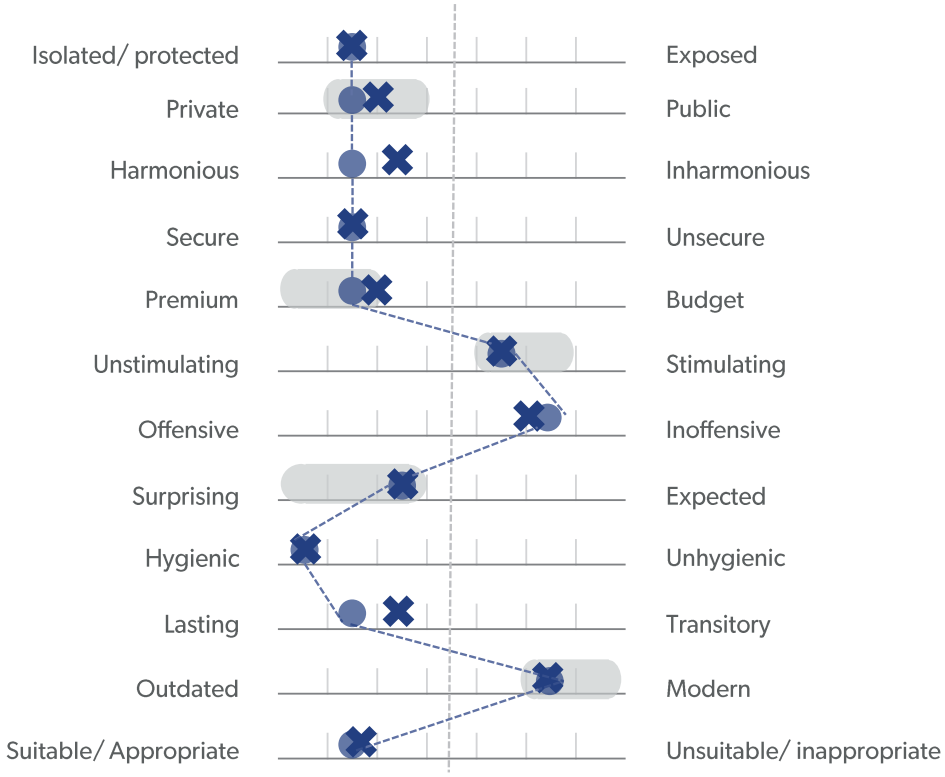


Fig 79. The mean (O) and median (X) values represents the participants' impressions from the INFO execution.

Secure -Unsecure

All participants in the INFO test felt secure. The two persons giving the lowest ratings on secure (one 3 and one 4) either had no opinion about it or expressed that he/she did not feel more secure there than anyplace else. The median mark for THEME was a number two on the scale and the responses were positive yet varying. One person believed the enhanced positive feeling in the washroom also leads to a more secure feeling, even though that wasn't actually the case. The only neutral response concerned the belief that it is the external context and not the inside of the washroom that determines how secure/unsecure it is experienced as.

Premium – Budget

It was clear that different things were considered when thinking about the premium/budget expression for INFO and THEME. No participant mentioned the cleanliness of the THEME washroom, the room itself or the essential products that existed in there to elicit a premium impression. The THEME washroom and its nature theme was experienced as more premium with a mean value of 1 vs 2, and median of 1,44 vs 2,62. The provisory installation was however contributory for two persons when marking the INFO washroom (mark 3 and 6) whereas no one considered it for the THEME-washroom. The different light settings of INFO and THEME could have contributed to what was regarded when evaluating the premium/budget expression. The dimmed light put the concept more in focus for THEME and shifted the focus from the products in the washroom and the cleanliness to the nature theme, which was experienced as exclusive. The bright light of the INFO washroom could thus have contributed to the evaluation of the cleanliness and the washroom's products.

Unstimulating – Stimulating

The theme washroom was considered more stimulating than the info washroom (median 6 vs 5), where the INFO washroom was considered more interesting and "nice" than a normal equivalent washroom while the THEME washroom was overall considered pleasant and stimulating for philosophizing. The capability of the THEME execution to elicit associations and the altogether stronger impression it elicited is deemed likely to co-

incide with the users' stimulating attribution. The THEME washroom was also mentioned as stimulating for carrying out basal needs due to the purging water sound. It is considered beneficial to use as ambient sound in SWR:s as it then could be facilitative for users feeling a bit tense and thus quicken the process, however if used in the basin room or in a cubicle washroom it is important that queues won't be formed so that the users would have to stand and wait while listening to the stimulating water sound, as this could lead to bad user experiences.

THEME: "Stimulating because you include many senses that get a positive impression. And you get your intellection going when you see things and hear things that you usually don't"

THEME: " (Stimulating) To sit and listen and philosophize"

THEME: "That was a funny thing because I didn't want to wee but I did it anyway, I think it was the water sound"

Offensive – Inoffensive

The majority in the INFO tests responded that the washroom gave an inoffensive impression (with a mean value of 5,54), where disturbing impressions or the unclear function of masking sounds dragged the marks down. Overall it was experienced as an unprovocative concept washroom. The THEME washroom was considered slightly more inoffensive (with a mean value of 6,11). Most of the participants thought it was inoffensive however one person chose the mark four because she experienced the masking sound to be a bit disturbing/annoying. Conclusively, the concept can be experienced as offensive if the user perceives some stimuli to be too intense, or if some stimuli is experienced as incongruent.

Surprising – Expected

The INFO execution was overall experienced as more expected than the THEME execution and thus contributed to a milder degree of surprise. It is possible that the dimmed light in THEME affected the overall first impression of the washroom as it differs more from the original washroom than INFO does.

Hygienic – Unhygienic

The visual evaluation of the washrooms' hygienic standard was most prominent for their hygienic attributions, but the dimmed light in THEME was not said to affect this evaluation, which was a concern considered in the concept design of the user entrance of the washroom (see *"15.1. Development"*). This implies that the light level was sufficient to form an opinion about the washroom standard. It furthermore implies that the feature of dimming the light together with the growing projection, should be tested to evaluate its effect on the overall washroom experience. Positive impressions from the scents, the original washroom style and the nature sounds and theme in the washroom was believed to affect the perceived hygiene in the washroom. This stresses the importance to consider what effect the content has on the overall washroom experience; thus, the hygiene standard is a basal and fundamental user concern most essential for a good user experience (see *"10.2. The user needs"*).

Lasting – Transitory

The theme washroom made a larger impact on the visitors which made them think that the impression would be lasting, unlike for the info washroom where the opinions were split.

Outdated – Modern

The THEME washroom was considered more modern than INFO because it felt more special and rare to the participants. Also, it is possible that the THEME washroom was experienced as more modern because experiences through themes and stories is a current trend. Again, the Tork products in the washroom was mentioned for the INFO washroom as a contributor to the modern affect but not for the THEME washroom, suggesting that the SoliQube concept was more in focus in the THEME execution.

Appropriate/suitable – Inappropriate/unsuitable

The appropriateness and suitability depends on the surrounding environment and context of the washroom according to the participants. However, the separate parts of the concept aside from the masking sound were generally appreciated and regarded as suitable.

15.2.3. Opinions on concept executions

Opinions on the concept execution was gathered in the tests from user interviewes after the participants' use of the washroom (see chapter "*7.2. Phase B - Needs Identification*"). The results can be seen in full in appendix 13.6 *Concept execution*, and a summary follows in this chapter.

Intrusive image/video

As anticipated, the participants stated that the INFO image must be possible to ignore and mustn't be experienced as intrusive or "in the face", either in display execution, regarding image size or motion, or type of message.

Image/video size and placement

For both concepts, the placement on the door was experienced as good and natural. Only for the THEME concept the men mentioned that they sometimes stood up when urinating as a factor that affected the usage and experience, and not for the INFO concept. Only one man out of eight men in total however said that he also would have wanted an image above the toilet seat.

For the INFO concept, almost all visitors read the information when standing up since they noticed it when entering or while still standing up, so for them it was not obvious that standing up and urinating would affect the usage of the washroom concept; it did not interfere with their way of using the washroom.

Also, the INFO image is "consumed" once the message has been received, unlike the THEME film that the users want to experience during a longer time in the washroom. So, the usage is different for the two concept executions. Even though the image or video is not seen at times, the audio, ambient light and scent can however not be ignored and are experienced during the entire visit.

The fact that the image was shown from the beginning in the tests affected the visitors' behaviour to read it once they saw it, which was right away. One could with deliberate design decisions affect when the visitor sees the image, which then would affect their behaviour. But, to show the image right away as in the tests resulted in that all visitors actually saw the image and got the message. This implies that the INFO image should appear when the user closes the door as intended. Thus, the placement on the door should then be adjusted to a standing reading position.

One of twenty-three participants in the INFO and THEME tests together expressed suspicion and distrust about the technical gadgets in the washroom. This shows that only projecting something onto the door was regarded as non-intrusive and reliable.

INFO: " It was good, natural placement, you look for things to put an eye on"

INFO: (What did you think about the placement?) "I didn't think about it; it became very evident that it was there kind of"

INFO: "Very instantaneously, I wonder if it wasn't before I even sat down on the toilet when I thought "what does it say on the door?" [...] So I saw it very early"

INFO: "Yes you see it because you lock the door and eh, work a little with the door. So yes, I think you could have it there, cause is it behind the toilet you can't see it at all"

THEME:"Most guys I think stand up in public washrooms which makes you unable to see the film, only when you walk in and out"

THEME:One person believed that even if he would sit down the first couple of times he would get lazy and start standing up again.

THEME: "Personally, I would avoid sitting on a public toilet. However, even if it was my home toilet I would probably be too lazy to sit down after a while. I would get used to it (the concept)"

Impression of visual content

Three persons said that the image was positive since it somewhat replaces the need to look at one's phone during the visit, while another person said that he would choose to look at his phone instead of reading the message. In the THEME tests no participant mentioned their usage of their mobile phones. This could imply that they weren't thinking about their phones during the visit because they were busy experiencing the washroom concept. It could also be about the different usages of INFO and THEME, where the users read a message in INFO and thereof think about their phones that they otherwise "read

on", while the THEME video is an ambient experience that doesn't resemble the activities one has/does with one's phone.

The concept content is important for how the concept is experienced, and what is considered relevant is personal. Some participants however believed it to be positive that something was there at all, that the image contributed to a pleasantness/comfort of the room. Hence it was pointed out that the white and clean look of the washroom affected the experience of the image, which emphasises the importance of an image designed to fit the style of the washroom. If successful, the image can become a digital decoration in the room.

Showing information connected to the building and business in which the washroom is located, something of "general interest" (that also had a positive meaning to most the participants) lead to many positive reactions. The video of the nature scene had a pleasing and relaxing effect on the users as expected (see "*5.5. User experience*").

INFO:"Nice. I'm one of those who often bring up my phone even if I'm only taking a wee. I still believe it's a moment of quiet, especially now that we're in this kind of large office, then it's a private moment where I seize the opportunity to bring out the mobile phone. So, in this case I didn't even think of my own phone but I thought it was nice that there was some piece of information on the wall and some music"

INFO: " […] are you sitting on the toilet and there is something on the door, then you look at it and read it, so it can be a way to focus"

INFO:" That it was white was the first impression, white and clean, a bit like clinical. But once you turned around it felt a bit cosier at once when you saw the projection"

INFO: Yes, it became more like a decoration […] if not everything had been so white then perhaps it would have been cluttered and you would have thought it was chaotic and stressful, but here it was a bit like a painting or something like that"

TEME:"Especially in public washrooms you can feel tense, stressed and uncomfortable, and I think it (the THEME concept) is a good strategy to get rid of that"

TEME: "I think that was the reason to why I peed. All together combined was the stimulating factor. It was fine because it was such a settle movie. It was like a cinemograph; you know when only some parts are moving."

Ambient audial impression

The nature sound had a relaxing effect on all participants and is thus a more uncontroversial option unlike music that individuals have different preferences and opinions about. However, only eliciting a neutral affection towards the music improves the washroom experience overall just because there is music. One part of this is the masking effect of the music that was regarded positive. Further, including water sound in THEME was perceived as positive when stimulating the basal needs and could possibly result in more efficient washroom visits for those having problems to relieve themselves in public washrooms.

INFO: "There was some music and it was a bit welcoming I thought. Then you felt a bit taken care of, in a good way"

INFO: "The advantage is like in Japan and these where you shouldn't quite be heard, - what you do. It (the music) suppresses those sounds so that you don't have to put on the water tap so that it (natural sounds) won't be heard. Maybe also that it, a bit depending on the music type, feels more relaxing"

THEME: "Yes, it was a bit fun with this torrential sound I mean, because it could be something that makes you relax, cause if you hear purging water it might help if you have problems to pee"

THEME: This thing with hearing music or tweet (is positive). Especially this purging, that is just great. And would it exist in a public washroom then I think you can suppress these (edgy) feelings and instead think "what is this?""

Masking sounds

Most participants did not understand the point with the masking sound before it was explained to them how it ought to be used. It is nothing intuitive but requires an explanation, either because it is new to them, or because they don't feel or have the need to disguise sounds. It's also possible that the test situation didn't bring out the feelings under-

lying such a need (see "*21. Discussion of process and methodology*").

One participant had never thought about masking any sounds, while others were more familiar with it, which implied that it is very individual if they saw a need for it or not. For the majority, the background sound or music was sufficient as a disguise in the SWR and many did not want to handle a masking sound themselves; the washroom should preferably already be masking.

Different aspects were considered exposing with the masking sounds. Using the flush sound could seem like the user flushes the toilet several times which could be experienced as exposing. Further if the sound is experienced to resemble natural sounds from carrying out "number two", or if the sound was perceived as too loud, this is also experienced as exposing. Using masking sounds in a cubicle washroom was stated by one participant as being too exposing. Difficulties in timing the masking sound means that it is difficult to use the first time which is negative.

THEME: "Well if you are in a public washroom and know that you will do more than peeing then maybe it would be nice to have some sound or music that took it away. But there is no need for anything more...Only that purging water does a lot and distracts from much else".

THEME: "The bird song was very good, but not this where you put your hand on it. I didn't think it matched the nature and the sound, so there was no harmony in it. It also sounded pretty loud so it made me feel quite exposed"

THEME: "So, it is definitely something people would like. But in public toilet ... the sound would be weird in cubicles unless it is one sound for the whole room. It would help to not mask my own sound but others. you don't want to hear others. I don't think I would need strictly control over it. if it was there, it would be nice with some music...I'm not sure I had bothered to push a button"

Olfactory impression

The cherry-scent used in INFO was most often not as discrete as the pine-scent in regards of intensity, the cherry scent was also more dominant in character than the pine scent.

The effect of the intensity on the perceived pleasantness of the scent was evident. The intensity of the scent and what is experienced as too little or too much is however individual; a smoker can for example have reduced olfaction sense.

The cherry-scent was also mentioned by some participants to be perfume-like in a negative regard. It is possible that the pine scent is more viable than the cherry scent because of its associations to nature although this cannot be strengthened by the tests. The tests could however conclude that both intensity and liking affects the influence on the washroom experience.

Some of the participants believed the scent to contribute to the positive washroom experience, out of which a few, two for THEME and one for INFO, believed it also contributed to a hygienical impression of the washroom for different reasons. How much the scent actually affected the perceived hygiene of the washroom was however not investigated.

It is difficult not to be affected by or smell an unpleasant scent the user meets when entering a washroom. To instead be met with a pleasant scent or a scent of neutral affect was experienced as nice.

INFO: "[...] if it smells very intensely I think it is a little too much, otherwise it is positive because if you use a washroom that isn't your own and you have to do "number two", then it's not that fun to know that you will leave a fragrance trace after you"

INFO: "I am sensitive to very many things so I think that fragrance is bothering if it is intensely perfumed. And the fragrance that existed in there, it wasn't that strong but I didn't think it smelled nice either, it was very like synthetic"

THEME: "Fantastic. You could tell that it was just cleaned. You don't know but you think that - thanks to the smell - it appeared as it was just cleaned"

THEME: "Positive. Not so that it was...There are synthetic scents or perfume scents that aren't nice cause it becomes too much, but it (the added scent) was good in the sense that it was just enough"

THEME: "First I was surprised and then I

thought it smelled nice. It was good. It usually doesn't, but that was of course nice. Pretty good first impression"

THEME: "I didn't think about it (the added fragrance) because I automatically turn off my nose because I have such terrible shivers for public washrooms"

Lighting

It was predominantly positive with a dimmed lighting in the washroom for the theme concept. The lighting for the INFO execution was however also appreciated by the visitors which indicates that the lighting was suitable to the different concepts. In the THEME execution, where the experience of the film is more central to the concept, the lighting had the effect to bring out the projection.

The dimmed light in THEME likely made the participants experience the film, sound and scent better and in addition draw the attention away from the washroom itself and its hygiene products.

THEME: " It was a bit blue-ish. It felt like in a lab or as some kind of bactericidal light. Not a warm light. Not directly unpleasant but different light,. Well, could maybe have been a bit better"

THEME: "I went to relaxation mode. I felt I need to relax and go to sleep rather than go to work. But we need the light to enjoy the projector"

The design of the entrance

From the tests, it was found that the design of the entrance in the SWR was of great importance for the washroom experience; the surprise effect, but also for the forewarning of the concept to not cause bewildering and deterrent. The light and sound was too aggressive and surprising in the test executions, which affected the experience negatively. The entrance in the tests, where both sound, projection and lighting were on from start, deviated from the intended concept design, and the reactions elicited from the entrances in the tests strengthens the intended design.

In the THEME execution, it was said that the light would dim down while the image was enlarged to create an effect and draw the attention to the image, but also to allow the user to initially assess the standard and hygiene of the washroom when looking in. From the tests where the light was dimmed from the beginning, it turned out that the dim light had no effect on the evaluation of the washroom's hygiene. The effect of the dimmed light must therefore be tested to draw conclusions about its necessity for the overall washroom experience. If the light is constantly dimmed instead of turned up and down for each visit, it can cut down a little on the energy consumption.

Proposals for THEME

One participant mentioned advantages with THEME for people with kids because it could be easier to make the kids want to use the washroom, and posed that it could benefit companies if families would be drawn to their specific facilities. It was also pointed out that a time limit or a cooled interest after some time would be good to avoid problems with making it too entertaining for kids. Another proposal was to let the user know if there is a line waiting or not to know whether there is time for the kids to play around or the visitor to linger in the washroom.

Suitable business areas

The participants had different believes about SoliQube's appropriateness in different business areas, which is affected by their previous experiences and expectations. The acceptance of SoliQube seemed questionable by a small number of the participants at formal locations such as offices and hospitals, but were evaluated as more suitable at entertainment and service sites where one goes to experience things. The participants' evaluation of the concept's applicableness was most likely also coloured by the test executions of SoliQube, and could thus prove to be different for other examples.

Content suitable to context

With reservation for that a private experience is highly prioritized (which can be enhanced through using disguising sound/music and scent), the effect on the user should suit the main context. In the test execution of THEME, the participants were expected to become calm, and they did. However, one person experienced that he became too calm, that the effect of the washroom concept was too relaxing and made him want to go to

sleep. This effect was not deemed suitable at the workplace where the test was carried out, which strengthens that the content and the theme should be adapted after the desired effect in the context and environment.

16. Conclusive evaluation of Soli-Qube - The Impressions

From the user tests of the concept SoliQube - The Impressions and its proposed two executions INFO and THEME, it was found that they elicited a positive washroom experience. All elements used; visual, audial and olfactory elements; was found to fill a function in the washroom that predominantly aligned with the intention, and created an atmosphere that affected the user's mood. The INFO and THEME executions were found to contribute to a private and protected washroom experience. They were perceived as hygienic, modern, inoffensive and suitable in the washroom, and further perceived as stimulating, surprising and to leave a lasting impression.

16.1. The impression guidelines

The findings from the evaluation of the Impression design was transformed into guidelines to use when designing the Impression of SoliQube.

Impression

Elements

- Use music (or ambient sound), projected image and ambient scent together for the INFO execution
- Use ambient sound (or/and music), projected still video of a scene, and ambient scent together for the THEME execution
- Utilize nature elements for a relaxing effect on the user

Congruence

- The elements of SoliQube should be congruent
- The atmosphere enhanced with SoliQube and hence the effect on the user should be congruent with the main context
- The visual content should be designed to fit the style of the washroom
- The message in INFO should be tied to the surrounding envi-ronment and the business
- Music should be used that fit the context and the brand

Usage

- The sound and image/video should be toned in at the point of entering the SWR, and toned out at the point of leaving
- The music (or sound) in INFO should be constant and the image or video should be toned in for cubicle washrooms
- The intensity of the audial, olfactory and visual stimuli should be carefully regulated for best effect
- The light could be constant or dimmed down at the user's en-trance in SWRs
- The light should be constant in cubicle washrooms
- Use dimmed lighting to enhance the impression of SoliQube – when appropriate to the context
- The music and ambient sound should be masking in volume and charactersitics
- Music tempo should be used after desired effect on the user
- Low tempo music should be used when the users must stand in line and wait
- Regard scent associations across cultures
- Use scents that are familiar to the user, that s/he likely has experienced before

17. SoliQube – The interaction

This chapter describes the interactive part of the final concept SoliQube and the development and evaluation of its interactive functions. The motives behind the interactive functionalities and how they are executed are presented in "*17.1. Development*". Evaluation of chosen functional principles of the concept are presented through test results and analysis in chapter "*17.2. Evaluation of gesture interaction*".

17.1. Development

This chapter explains how the interactive parts of SoliQube are executed, and reports on the development behind it. As for SoliQube – The impression, this is explained in two chapters; *The Usage and Content*. The Usage answer the questions of how and when interaction shall be performed during the usage and the underlying motives, whereas The Content describes what the interaction shall include.

17.1.1. The Usage

Through extending the projected image to a user interface, the concept extends from encompassing communication to the visitors to enabling communication with the visitors. By utilizing touch-free interactions it allows the visitors to control new functionality in the washroom in a hygienic and fun way while giving the customer an opportunity to receive useful information. The motives to why touch-free interaction shall be used are treated in chapter "*12.2. Correlation of User and Customer needs*" and "*13.2.2. Evaluation of Use Design Concepts into new guidelines*"). As SoliQube treats the interaction on a conceptual level, the design decisions were made on the functional level and was not taken much further. This chapter treats the motives of how and when such functional interaction can be executed and mentions relevant aspects for further work. The reasoning is mainly based on the usage map and technology benchmark. (See chapter "*7.4.1. Usage Map*" and "*7.4.3. Investigation of interactive methods*").

Decision of interactive method

Interaction with gestures can be performed in several ways. In general, people are not very used to interact with interfaces through touch-free gesture interaction or motion control even though this type of communicative tool is increasing on the market.

Touch-free interaction can be executed in several ways. It can imply voice steering, eye-tracking or gesture controls to mention a few. The different technologies of interaction were investigated with focus on the effect on the user and not very much on the technical functionalities. To make sure the interactive function should be directly available when entering the washroom, the interaction needs to be done without other products or devices as a phone or control.

As the washroom context is a very private space and the interaction aimed to elicit this experience, voice control was not considered to be a suitable option. Steering an interface with voice-control would directly make the user uncomfortable since it should drag the attention to the cubicle or SWR as well as people outside would get information about what the interaction was about.

Eye-tracking is a sensor technology that is growing rapidly and most of the modern solutions are using high-resolution cameras or optical sensors along with near-infrared technology that are tracking the movement of the pupil (Bryn Farnsworth, 2017). The technology can be useful to get input on presence, consciousness or mental states of the users and know exactly where the eyes are focused (Tobii.com, 2017). The technology was considered difficult to use in the washroom environment since the user needs to keep a very steady focus with the eyes even though the interaction is not the main purpose of the visit.

Gesture Control Technology

The arguments for using gesture control were that more people would feel comfortable with gesture control, since it is a technology more known and implemented on the market. People are more used to sensors tracking physical movements than small motion tracking of the eye, and might feel more monitored by eye-tracking. That might further influence how safe or suspicious users feel with the technology. Another aspect was that the user

is given more control with gestures. The eyes are used to scan, investigate and discover things around and the risk of making mistakes in the interaction seemed probable with eye-tracking.

Gestures can be classified by the typologies arbitrary, mimetic and dietic gestures. Mimetic gestures are based on motions that imitates or mimic the shape of an object. Deictic gestures are based on movements with a direction, like pointing on an object. This type of gesture is relative to the surrounding context or interface. Arbitrary gestures need to be learned to be interpreted which could be a problem where the interaction must be efficient (Cohen, 1999).

Entertainment and mistakes put demands on gestures

One of the purposes with interaction in the washroom was to elicit a fun user experience which was deemed more probable with physical movements than just moving the eyes. An interactive system might fail if the interaction is not fluid and enjoyable. This is something that is used in game designs, especially the most frequent gestures or moves must be enjoyable as well as comfortable (Wigdor and Wixon, 2011).

It is also important to be aware of consequences of a gesture. When making a gesture, like swiping right, the hand will also move to the left going back to the starting point, which also can be registered as a gesture. (Chalyi and Hasoshyn, 2015). This can affect the user experience since the risk of mistakes increase. The gestures shall thus be simple and clear and the risk of performing them by mistakes shall be avoided.

Usability decides the gesture typology

Even though mistakes should be avoided, the guessability is not of highest priority. The learnability of the interaction and how to guide the user to correct performance by gestural primitives are more important (Maher and Lee, 2017).

The usability of the interaction is crucial for the interaction to work properly. This is done in the interplay between the gestures and the interface. Natural User Interaction (NUI) is a recommended interaction strategy that aims to let the user interact with as natural and intuitive actions and gestures as possible to make it similar to everyday human behaviour (Chalyi and Hasoshyn, 2018).

With a natural user interface skilled use is usually obtained quickly, it is efficient to learn, fun to use and the gestures are fluid and smooth. The feedback as well as feed-forward is clear and help the user to succeed with the interaction (Wigdor and Wixon, 2011). The gestures shall be efficient to perform since the whole visit shall be efficient.

Context put demands on how and when to interact

Gesture Control opens for many types of interactive manners implying both big movements and small hand gesture motions. The use of gestures inside the washroom is limited to the space inside the SWR or cubicle and limit the numbers of possible gestures. Although it is big enough to enable most gestures, the space can affect the comfort when performing them, especially since the users don't want to touch anything inside the washroom. The technology must also be able to detect the gestures and movements and not mistake them for other motions that the user carries out in the washroom.

Based on the usage map, the interaction was considered most likely for a user to try after the user has seated on the toilet since the focus prior to that should be on the first impressions of the washroom and the actual purpose of the visit. Since all visitors don't sit down on the toilet seat during their visit, and some will be preoccupied with the normal washroom activities, interaction should also be enabled afterwards when standing up in front of the door in the end of the visit (if the size of the room or cubicle allows it).

Another reason to enable interaction both for standing and sitting is in the case of feedback. To give feedback is completely optional for the user and a favour for the customer. It demands some effort and focus, and the user should not be forced to give feedback at a specific moment during the visit. Hence, to increase the likelihood that the user will give feedback, the possibility should be available during the entire visit, both when standing and sitting.

The masking sound, which also is an inter-

active function, should be easily accessed during the visit but it's only useful at the time when the user is carrying out her/his needs and doesn't have to be shown at another time. However, the interface of SoliQube will not be very cluttered, so even if the interactive features only are used during a certain time-slot, it's not a problem to use a constant interface and enable users to use the features whenever.

17.1.2. Content of interactive functions

The content of the interactive part in SoliQube was decided on a functional level based on the functional guidelines and the requirements set in the concept development chapter. Thus, it was not futher developed. In future work, the content of the interaction is favourably an aspect focused on in the "detailed design" of ACD3 (hänvisa till metodkapitel).

Show the functions

Giving feedback should not be forced onto the visitor to not cause irritation or bad will, but be an option the user actively makes. Making it to an option one actively chooses also prevents that people do it for no reason and thus reduces the risk that the customers receive unreliable input/data. To actively go to the feedback option will result in more serious answers which is very beneficial for the customers. To enable this active decision, the interface of SoliQube should be lit up and hint that the feedback option is available. The "start screen" shall as well show the masking sound function clearly to be able to use this quickly.

How the functions are shown on the start screen and in the interface can have a big impact on if the user would try it or not. The functions shall not be intrusive and disturb the users but they shall be inspired to try it out and complete it. There is a fine balance of making the appearance serious enough to get serious answers and fun enough to inspire more people to give feedback. The appearance must allow normal usage of the washroom and not take too much attention from the main purpose of the visit.

Design coherence with theme

How the user experiences the interaction has much to do with its appearance. Since SoliQube is a solution not only developed for the interactive purpose, the execution of these functions must cohere with the rest of the solution. SoliQube aims to elicit a good experience through multi-sensory impressions (see chapter "*15. SoliQube – The impressions*") and therefore should the content of the interactive part follow this as well. The interface shall fit this on different levels depending on what the purpose of the customer business might be.

As an example, an experience-focused event-business could use SoliQube to communicate a cool experience of the user being out in space during their space-theme-event. In this case the feedback might be given by interacting with moving planets or rating the visit with stars. The interaction can also be simple in its functionality, but aesthetically fit well to the general theme. To make the feedback coherent with the theme will make it more fun and elicit a better user experience.

Number of Sub-functions

As mentioned in the functionality guidelines, the interaction should be efficient. This put demands on the content of the interactive functions to not be too time consuming. The user should be able to give feedback in an efficient way with limited number of questions, and one or two actions should be enough to use the masking sound. As seen in Part 1, both customers and users want the visit to be efficient, and to succeed with the feedback execution the required time and effort from the user must be limited. The number of feedback questions should be limited and the user should be able to answer all questions during approximately 30 seconds. The questions should preferably be multiple-choice questions or rating scale questions. The actual content can differ a lot but shall enable the customers to get the information they need. In some cases, the users might be able to motivate the feedback as long as this can be done efficiently without typing.

17.2. Evaluation of gesture interaction

To create and launch a product based on gesture control on the market can be very challenging and need to be well thought through to obtain acceptance by the users, as can be read in the development chapter "*17.1.1. The*

Usage". The technology of how to interact by gesture control is constantly in development and there are several technologies of doing it today. Also, there are many design aspects that affect the final execution. In SoliQube, the interaction is decided on a functional basis and the first thing to investigate should not be the specific technology of gesture control but the usage of the human machine interaction, in this case how different gestures would work inside the washroom context with the aim and purpose of giving feedback.

The attitudes towards, and usage of three different interactive gestures were evaluated through user tests and interviews. The procedure and performance of the test is described in detail in chapter"*7.4.7. Design of interaction test*", and it aimed to investigate how gesture-based interactivity and feedback was perceived in the washroom context and how different motions might affect the experience.

The focus of the test was put on the ergonomics and comfort of gestures that were demanded to be able to answer a number of questions. By letting the users trying out different gestures, they could more easily relate to and give opinions about the idea of interaction with gestures and giving feedback inside a public washroom. Also, usability aspects were a natural part of the test since it implied interactive interplay between gestures and interface. However, the prerequisites for good usability can be much further developed and improved than in the test set-up. The three evaluated gesture typologies were as followed:

Interaction with Hand gestures

In test 1, the participants were supposed to use simple hand gestures such as pointing, thumbs up and thumbs down or a fist to make a choice and answer three questions. The symbols where placed in the same place for all three questions.

Interaction through "mouse-click"

The participants were supposed to answer three questions with three alternatives each by moving a pointing arrow with their hand over the interface, and clicking by closing the hand to a fist. The answers to the three questions where placed on different heights.

Interaction through swiping:

The participants should answer one question by scrolling among alternatives in a vertical list and confirm the choice when switching window. This was performed with swiping movements with the hand and arm both up, down, left and right.

17.2.1. Comfort and impact on physical aspects

One important factor for making the user accept the concept is that the physical motions used for interaction are comfortable and not disturbing or strenuous to perform. The participants in the test were asked to rate the comfort on a scale from 1-5, where 1 was "Not at all comfortable" and 5 was "Very comfortable". The result is shown in Fig 83. :

Big vs. small motions

The result can mainly be explained by the physical effort that was required to perform the test. 8 of 9 participants thought that small motions felt more comfortable than big, which explains why they rated hand-gestures as the most comfortable way of interaction. The participants thought that the hand-gesture-concept was less strenuous compared to the other concepts since they only had to switch the hand gesture and not move the whole arm. One said that it was like using dactylology.

When comparing the mouse-click to hand-gestures, one participant between 25-30 said: "It didn't feel as good as the hand-gestures, - thought it was a bit difficult movement for shoulder and arm, and then I am relatively young."

8 persons thought the mouse-click-concept was a bit strenuous since they did relatively big movements when steering the mouse. They felt they should move the hand to the corresponding position on the screen which made them think the answers that were placed high up in the interface were difficult

to choose. “I stretched myself very much here and it felt as my arm wasn’t long enough”. The mouse-click interaction would not be very suitable for elderly people if the high motions are required. All participants agreed on that the feedback questions with the alternatives positioned further down in the interface were easier to perform. “I wanted to put the hand in the same height as the picture, so it is better in a lower position.” According to one person the mouse-click would have been much easier to use if the motions could have been done in a smaller representation. To provide the user with good gesture feedback is thus important to let the user know how big motions that are required.

In the swiping-concept the result varied extensively between the participants. They mostly carried out the horizontal motion right in front of themselves, but the vertical motion was performed in different heights. The horizontal motion was considered the easiest by 7 out of 9 persons, and the vertical swipe as more uncomfortable. This implies that performing the motions far away from the body is considered as more strenuous and hard, which is expected.

Another argument to why small gestures were considered more comfortable was that there was a smaller risk to accidentally touch other things in the room: “If it is a small public toilet, I would not want to accidentally touch the surrounding walls.” Another person said “I would have preferred the small motions since you don’t have to move that much. You might have some bag or clothes on and there is not much space”.

Interface affecting the physical fatigue

The physical comfort is affected by the degree of physical actions that are required by the interface to answer the questions. To answer one question, the hand-gesture-inter-

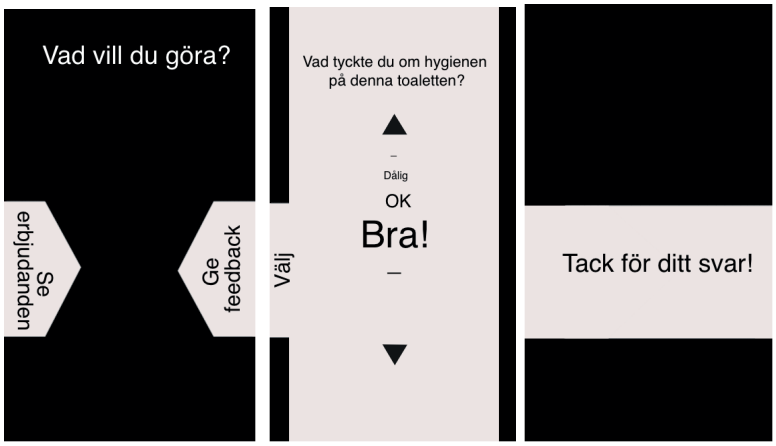
action demanded one motion in total, and the mouse-click-interaction demanded one motion for moving the arrow and one for choosing alternative. In the swiping-interaction the participants had to perform one swipe every time they wanted to switch alternative, then one to make a choice. This was required since the interface didn't show all available options at once and the user had to perform the motion several times to scroll among the alternatives. The swiping movements were simple to perform one and one, but was tiring when repeated as when to scroll.

Repetition of movements also increase the time it takes to answer the question. Some movements are simple to perform once or during a short time, but if it is a repetitive or continuous motion which requires physical movements during a long time it can become strenuous. The mouse-click-interaction was time-consuming because the arrow was a bit complicated to manoeuvre. It made the motion take some time and made it thus heavier than necessary: "With this few available choices, the

Fig 80. Interface design used when testing Interaction with hand gestures.

Fig 81. Interface design used when testing Interaction through mouse-click.

Fig 82. Interface design used when testing Interaction through swiping.



	Mean	Median
Interaction with hand gestures	4,1	4,5
Interaction through "mouse-click"	3	3
Interaction through swiping	1,3	1

Fig 83. Result of participants rating of comfort.

mouse was just annoying to use. If there were more alternatives it would be good, then I could be more precise. But in this situation, I prefer another".

Over all, the physical fatigue was not a problem for the participants in the test, and it wouldn't be a big issue for the concept since the washroom visit normally is short and the number of questions limited. However, it is important to keep the interface as efficient as possible and the number of required movements as few as possible.

The tests showed that the time and number of steps shall be minimized in the interaction. Also, the usability and understanding is as important since the interaction should be completed in a very short time, not least in a context with many first-time visitors.

Mental model affecting the physical performance

When the participants had made their guess of how to perform the interaction, they got a verbal instruction of how to perform it. Despite being secure of what and how to do it, they interpreted instructions and performed the movements differently. Two persons in the swiping test liked to do bigger motions since they felt as more would happen then. They knew it wasn't necessary but continued doing big motions because they thought it felt better.

An example that occurred in the tests was the interpretation of the swiping motions; "swiping" was more often correctly interpreted horizontally than vertically:

"It felt weird to do it vertically, but it is because I am more used to swipe horizontally".

On most mobile phones, it is more common to swipe horizontally than vertically, so people are not used to the swiping motion vertically as they are horizontally. This made the participants scroll vertically despite the instruction to swipe.

Participants claimed that motions felt natural because they had done it before or were used to it. When interacting with the mouse-click, one person claimed it felt even better to move the hand all over the surface, even if that was uncomfortable, because it was like how she normally would use a mouse.

One participant was very aware of the risk of making mistakes and worried that he should accidentally pick the wrong answer. The concern of doing wrong is a result of previous experiences and a mental model that these types of interactive motions should be difficult to distinguish from each other. To avoid these mistakes, he wanted to perform big clear motions that could not be registered as wrong. Thus, his physical behaviour was affected by his own mental model.

It was clear that the mental model and earlier experiences affect what people are used to and think is comfortable as well as how they interpret instructions. It is thus important to leave some margins for errors; each person will never do the exact same movements.

17.2.2. Emotional reactions to interaction with gestures

The emotional reaction to the three different ways to interact is of great importance since the aim is to achieve a pleasant way for the user to give feedback while visiting the washroom. The emotional reaction is dependent on the usability and comfort. If those parts

don't work smoothly there is a risk that negative experiences will be elicited. However, even if the interaction is easy and the product is comfortable to use, the experience is dependent on additional things that are more connected to the function and purpose of the interaction.

Integrity and surveillance

In general, the interaction in these tests didn't elicit a lot of emotions. However, one reoccurring consideration was the integrity. In all three concepts, some participant mentioned that they probably would have felt monitored if they had performed this type of interaction inside a washroom. The worry was most prominent in the hand gesture concept. Two persons mentioned that they felt scepticism towards the hand gestures because they felt someone or something was watching. One of them was more sceptical towards the hand gestures since the gestures were smaller and thus would be harder for the system to detect. S/he was also concerned about that the swiping-concept could have a hidden camera. S/he said: "I just hope there isn't a camera that is filming me, you can get a bit suspicious when you sit and gesticulate by yourself." The worries of surveillance were not that big in the mouse-click-test.

One participant would feel a bit monitored dependent on the location and surroundings of the washroom: "If it was in a fine shopping mall or a better restaurant it had been ok, but if it was ruff or if I didn't know the surroundings I would have been more sceptic. The surroundings make me feel safe".

Another person that was sceptical towards the surveillance said that it felt a bit scary that the interaction in general worked inside the cubicle, and that it would have felt as s/he wasn't alone in the cubicle.

"Sensors.. what more can they detect? I am not sure I had dared to give feedback. Or I might have tested it carefully and then be scared if it worked."

The same person also suggested that the feedback could have been given outside the cubicle in the big washroom instead.

The surroundings and context matters for if the concept shall be accepted by the users. That is probably more important than the actual interaction to not feel monitored. It is also crucial that the users can trust the technology, and that is dependent of how well the users understand it and how common it is on the market. The solution must inform the user about its purpose and how it works.

The differences in acceptance might depend on the type of interaction. The mouse-click motion is something one recognises and doesn't associate with a hidden camera; it is associated with registered movements through signals, but no camera. The hand-gestures are the opposite. Reacting on a shape makes people associate it to a camera, which make the participants more nervous and worried of being overlooked.

Anonymity makes it less awkward

8 of 9 participants talked about advantages of being alone when performing the feedback and thought the chance they would give feedback would increase if they could do it inside the cubicle by themselves. The arguments were that they should feel more anonymous, could spend more time on trying to understand how to do it, and that it feels better to do gestures when nobody is watching.

The emotional reaction to the gestures differed a lot. In the hand-gesture concept one person claimed it felt weird to do the hand-gestures since it felt a bit corny and childish, while another said it was natural because she sees that everywhere nowadays. To perform gestures and waving around was not something the participants were very used to, so several persons thought it felt a bit strange and awkward, but most of them said it would work if they were alone.

The anonymity is important to make people want to interact and give feedback. However, if the user feels monitored by a camera or similar, the user would feel more exposed inside the cubicle than outside around other people. If the user can feel safe inside the cubicle or SWR, that is the best place to give feedback, but if not, there's a big risk they would skip it.

Entertainment, mood and motive

To elicit a pleasant experience, the interaction should elicit positive emotions. Interaction by gestures was by the participants considered to be something new, especially in this envi-

ronment and context. 8 out of 10 mentioned positive things about the interaction in the tests. Common arguments to why it was "a fun thing" was that it is fun and exciting to try something new and that it was cool to be able to steer the interface with gestures.

Four participants expressed that they were entertained after performing the mouse-click test. An interactive manner that enables the user to have control and be active may make the performance more fun as the mouse-click-test was appreciated. Another reason to why this kind of gestures can be entertaining is because they can be associated to something fun, as mouse-click could be associated with computer games. Two persons thought the hand-gestures were entertaining. In the hand-gesture test one person said: "I haven't seen this before, so there was a comical moment because my associations went a bit crazy." This is instead an example of how the surprising effect can elicit associations, not to anything familiar but instead something new and unexpected. Another person didn't think the hand-gesture test was particularly fun because it didn't elicit a surprising effect. "Right now people are used to gestures with touch-functions and similar, so I didn't think it was that fun..." As seen, gestures can be entertaining for different reasons, some because of the surprising effect, some more because of gamification. One person mentioned that the risk of making the interaction too fun is that people would stay for longer in the washroom. Especially children could think it was so fun they eventually could damage the system or misuse it.

The entertainment can be very important as a motive for the user. Three persons in the test said the chance they would use feedback inside a washroom would increase since the interaction was fun. One of them said that gestures would probably be the reason to why he would give feedback inside a washroom at all. An entertaining interaction would thus inspire more people to interact.

The mood of the users might also affect the motive a bit. In the test, the mood of the participants didn't seem to matter a lot though. Four participants said before the test that they were a bit stressed or strained, but that didn't seem to have a big impact on the result. Three of those were in general positive and expressed amusement in some way. However, one of them said that the mood can be vital to if s/he would give feedback or not: "That depends on the mood. I can imagine I would give feedback but not every day". Users in a good mood might thus be more positive in general and more eager to try something new. The mood can be affected by a lot of things in the washroom. If everything is working smoothly and the user succeeds with the task, or if the interaction is very fun, s/he will get happy and satisfied.

A happy user might think it is fun to interact, but is less eager to give feedback since most people are more eager to give feedback when it's negative. Two persons in the test claimed that it is more probable that they would give feedback if they were dissatisfied or wanted to complain about something than if they were happy.

The challenge is to make people want to give both positive and negative feedback. The fun interaction can hopefully increase the chances that the visitors, independently of the mood, might want to interact and further give feedback either because it is entertaining or because they want to give a specific opinion.

Time and efficiency

4 participants talked about time as a vital factor for giving feedback or not. All the participants could give feedback dependent on the required time. If the interaction and feedback takes too much time, they would not use this concept. In that sense, gestures were good, since the feedback could be done while sitting on the toilet, not taking more time than necessary. One participant said that the efficiency is key for him/her to use it. The gestures must make the visit efficient, otherwise it is not worth it.

On the other hand, they felt that they could spend more time on the toilet because of this interactive function inside the cubicle. Being alone in the washroom makes it easier to spend more time trying to understand what to do. Another said s/he would only use gestures and feedback if s/he knew that no one was waiting in a queue outside.

The time efficiency is crucial if the concept should succeed. If the user feels it is time consuming they will stop immediately. However,

a solution shall enable the user to perform it in their own pace without any stress, but shall enable the user to answer questions very efficiently. SoliQube might be suitable at places where there is less risks of queues, to be sure people will have time to give feedback if they want to.

Hygiene

The hygiene is for many people an important factor inside a public washroom. Three of the participants liked interaction with gestures just because it felt hygienic to not be forced to touch anything. One said that gestures would have increased the chance of giving feedback as well. "I think it is hygienic instead of pushing buttons that everyone else have touched. It feels modern."

To push buttons was still considered to be a fair alternative since it is very efficient to use and people are used to it. However, 6 of 10 participants mentioned during the tests that gestures had a hygienic advantage; "It was nice since I didn't have to touch something unfresh. So it was positive. "

The tests confirmed that there is an advantage with having feedback with gestures. People that are aware of hygiene will more often give feedback if it can be done with gestures. The efficiency is however a more important aspect and the hygiene advantage is only useful if it is efficient to start with.

17.2.3. Impact on Usability (Guessability & Learnability)

The results from the interaction tests showed as expected that good usability is very important for the user to be satisfied and to get a good experience of the interaction. The users' opinions about using interactive functions were very dependent on the usability (see Theoretical framework; Usability), how they could guess what to do and how fast they learned. This had much to do with the interplay between gestures and the interface. The concept evaluation didn't focus on the usability since the interfaces were very simple and this interplay would need a lot of more work to be able to evaluate the usability aspects. However, the tests gave some inputs on what parameters that would affect the usability of this kind of interactive solution and make the interaction a good experience. The guessability was mainly affected by the interface appearance in terms of symbol recognition, instructions, information and guidance in the interface. The interface design is one of the most important tools to make this type of concept understandable. The guessability was also affected by the participants' earlier experiences of similar interactions and their mental models of interactive solutions. Additionally, the learnability, which is expected to be even more important for natural user interaction, (see interaction development) was affected by the feedback and feedforward from the interface and the responsivity in the actions.

17.2.4. Position and timing of interaction

Not everyone wanted to give the feedback while sitting on the toilet. Five persons thought they would like to do it after carrying out their needs when standing up. They thought it could be a good opportunity to do it from the toilet, but several of the participants thought they would be occupied with washroom related tasks instead and that it would feel more natural to do it in standing position. One person said that if the interaction was performed while standing, normal physical buttons could have been used. One participant said that "You don't notice it until you sit down, and when you stand up you come very close". One person thought the feedback responses would be high if people were sitting for a while: "If something pops up I would try it, instead if reading of a shampoo bottle".

People also had concerns about making mistakes. As one person said about the mouse-click-test:

"But if this was a real toilet, how should that work? If I take paper at the same time the question occur, what had happened?".

The participants didn't want the gestures to conflict with other motions that's done in the washroom. Therefore, some said they wanted to perform it while standing instead. The gestures of interaction must thus distinguish from gestures used for normal usage of the toilet. The normal usage should not be affected or disturbed by the interactive solution.

Many in the test wanted to stand up because it felt good, but realized that the risk is bigger that they wouldn't do it if they stood up and

was on their way. While sitting on the toilet, some will not have time or want to focus, but the ones that have nothing to do would with high probability try it out. For the best effect on the user experience the user should be enabled to choose when they want to interact.

However, when the interaction is enabled in the washroom is also of interest to the customers as they want to receive as much feedback as possible without preventing the flow. It is easier for the user to not choose to give feedback in standing position because then they have the choice to leave directly. While sitting on the toilet, some will not have time or want to focus, but the part of users that has nothing to do would probably try it out.

To increase the value for the customers, it might be better to design for sitting position and facilitate that behaviour. This should not be impossible since the solution would be something totally new on the market, and there are no related accustomed behaviours to break. The users would probably do as instructed and like that as well. The design of the solution could encourage the user to use it while sitting instead of standing, by indications and affordance in the interface design. Using dynamic interfaces and showing something suddenly increases the chance that the user would notice the function at the wanted time. To take the user's attention during the visit to steer the behaviour can be beneficial for the customer but not necessarily for the user. The user should not be forced or disturbed to perform something, so the function needs to be indicated and enable the user to make the decision, but not be intrusive. Dependent on the character of the affordance, the user can be distracted which can affect the efficiency as well as the experience.

18. Conclusive summary of SoliQube -The interaction

The functionality of interaction got positive responses in the evaluation. People liked gesture interaction because it was hygienic, fun and entertaining since it was something relatively new. The tests showed that an entertaining and hygienic way of interaction can help to increase the probability for feedback and increase the user experience which was what the concept aimed for. If it is inspiring and fun the user might try it out even if they´re in a bad mood. To make the interaction entertaining and comfortable it is very important that the interplay between gestures and interface cohere and have very good usability in terms of performance, satisfaction and efficiency.

18.1. Efficiency

One very important aspect of the interaction is that it shall be efficient to use. It was discussed in the development and confirmed in the evaluation. The users might not want to use the interactive function if it takes more time than a normal visit. The reasoning in the development was after evaluation considered to be confirmed. Additionally, people prefer to decide over the time themselves, and the solution should not stress anyone. It is important that they can decide if they want to perform the interaction and the interactive function shouldn't be forced onto the user. The users might appreciate SoliQube in environments with low volumes.

18.2. Comfort

The comfort was shown to not be a big reason to why people would like or dislike the interaction. Of course, it is important to make it as comfortable as possible, but people will probably be mentally tired before they become physically tired. If people will be physically tired depends on how often they visit the toilets and the comfort is more important if people would perform the gestures frequently. Small motions close to the body in a horizontal direction are recommended for good com-

fort. It was also shown that the interplay with the interface is important. If the usability is good, there´s a big chance that the interaction also will be physically comfortable.

18.3. Trust and surveillance

One of the purposes of gesture control was that it should be recognizable and not too foreign and frightening for the users if the function was communicated. It was expected that people, because of the lack of this communication would be suspicious in the test situation. This turned out to be a correct hypothesis. The test results showed that the technology must be communicated and that it is crucial that the users can trust the technology. Another unexpected finding in the test results was that the surroundings and context affected the user acceptance due to safety and trust. When people have higher expectations in general it is more probable that they would trust the technology. SoliQube might therefore be suitable in contexts where the user expects more premium solutions.

18.4. Where and when to interact

The user test showed that users would like to perform gesture interaction in a private space, like inside the cubicle or SWR if they feel safe, just as expected. When the users would like to interact was hard to predict and the results showed that it differs among the users. Initially people would like to interact while standing, but if doing it while sitting, they save time and it is more probable that they would try it out. This efficiency is also beneficial for the customer and the interaction should therefore be designed to be performed in sitting position. This can be done by taking the user's attention when they sit down, if it is not intrusive.

18.5. The interaction Guidelines

To summarize the findings from the evaluation of the Interaction, here is a number of guidelines to follow when creating the interactive part of SoliQube.

Interaction

Interactive functions

- Enable the user to give feedback dur-ing a visit
- Make it optional for the user to give feedback
- Highlight interactive functions with-out being intrusive to the user
- Communicate functionality of tech-nology to elicit trust

Usage

- Provide hygienic, fun and efficient gestures
- Enable gesture control through small motions
- Enable gestures close to the body
- Enable gestures in a horizontal direc-tion
- Facilitate and encourage user inter-action in sitting position
- Provide good usability through inter-play between interface and gestures

Implementation

- Implement SoliQube in higher wash-room standards to reach a better ef-fect of the interaction
- Implement interaction in environ-ments with low volumes and low risks of queues to reach a better ef-fect of the interaction

19. SoliQube – The final guidelines

The functional guidelines that was the foundation for the design of SoliQube were evolved to impression guidelines and interaction guidelines. Together, these make up the final guidelines that can be utilized for further development as well as a direction in development of similar concepts utilizing communication in washrooms. Since the impression and interaction guidelines are developed in parallel, they are kept separate. The guidelines can thus be used dependent on what functions that is the focus. An interactive solution should include both the impression guidelines and the interaction guidelines whereas an informative solution may not follow the guidelines for interaction.

The final guidelines thus constitute the impression and interaction guidelines.

Impression

Elements

- Use music (or ambient sound), projected image and ambient scent together for the INFO execution
- Use ambient sound (or/and music), projected still video of a scene, and ambient scent together for the THEME execution
- Utilize nature elements for a relaxing effect on the user

Congruence

- The elements of SoliQube should be congruent
- The atmosphere enhanced with SoliQube and hence the effect on the user should be congruent with the main context
- The visual content should be designed to fit the style of the washroom
- The message in INFO should be tied to the surrounding envi-ronment and the business
- Music should be used that fit the context and the brand

Usage

- The sound and image/video should be toned in at the point of entering the SWR, and toned out at the point of leaving
- The music (or sound) in INFO should be constant and the image or video should be toned in for cubicle washrooms
- The intensity of the audial, olfactory and visual stimuli should be carefully regulated for best effect
- The light could be constant or dimmed down at the user's en-trance in SWRs
- The light should be constant in cubicle washrooms
- Use dimmed lighting to enhance the impression of SoliQube – when appropriate to the context
- The music and ambient sound should be masking in volume and charactersitics
- Music tempo should be used after desired effect on the user
- Low tempo music should be used when the users must stand in line and wait
- Regard scent associations across cultures
- Use scents that are familiar to the user, that s/he likely has experienced before

ENDING

20. Discussion of result

In this chapter, the results and findings from PART 1 and PART 2 are discussed altogether.

20.1. The effect of impression vs interaction

This report describes the solution as one concept, SoliQube, that would reach the greatest effect as one concept covering many aspects. However, the development was departed in two fields, The impression and The interaction. The split of the development was mainly done to be able to evaluate the effect that the two parts would elicit, but also so that they could be tested separately.

If focusing on what effect the two parts of SoliQube would have, the impression-part would be much closer in reaching the desired effect - “A better user experience and increased communication values in the washroom”- than the interaction-part. According to the test results, SoliQube without the interaction functionality would elicit the desired effect. The question is therefore how much the effect would be enhanced if the interaction is added, thus it would be interesting to test SoliQube as a whole to evaluate if the effect would be enhanced with the interaction or not.

The interaction evaluation showed positive results and that it would have benefits both for the users and customers. The effect is thereof deemed probable to be greater if included, but to what price is unclear since it also implies higher cost, more advanced technology and implementation challenges.

The evaluation of the impression and the interaction parts showed positive results in both fields, but the tests were executed on different levels of detail and the effect of the two parts can’t be fairly compared. The interaction test was evaluating concept principles and not the emotional reaction to the washroom interactivity to the same extent. It is therefore difficult to determine how a fully functional interactive interface steered by gesture control would be perceived compared to the congruent, multisensory experience from the impression evaluation. What can be determined is that in combination, they would probably amplify the effect on the user.

Before developing the SoliQube concept further, the effects of the parts should be tested on an equal level. However, since the impression part already is much more developed and has proved to be effective in eliciting a better user experience, Essity is recommended to first develop the impression part to further investigate its effect, and meanwhile develop the interaction and perhaps add it in a later stage.

20.2. SoliQube in different contexts

Aspects of why and how SoliQube could be useful in different environments and contexts have occurred both in observations, user interviews, customer interviews and evaluations. SoliQube was designed for and evaluated in washrooms with high hygiene standard which is regarded a precondition for the concept to elicit the desired effect.

The customers of Essity have very different preconditions when it comes to affecting the washroom design, which sometimes depends on the business characteristics. In Chapter *"10.2. The user needs"*, it is explained that the spatial washroom experience and hygiene standard is crucial for the washroom experience, and further that holistic expressions were appreciated. This was strengthened in the user tests of SoliQube were the clean and fresh room was appraised and were the concept was believed to suit the style of the washroom. Suitable content of SoliQube to the washroom style is important for the user experience of the washroom and can thus be regarded as a precondition for a positive effect of the concept. Today, washrooms look very different and not all companies have the right preconditions to implement SoliQube, regarding the washroom's standard and regarding the functional properties of the washroom such as door placement, door colour and surface, meaning that some changes might be needed. These changes might not be feasible for all customers and one prominent question is to what extent customers will be willing to adapt their washrooms to be able to use this solution. If the value of the enhanced user experience exceeds the cost of making physical washroom adjustments, they might be willing to invest in the solution, and this must be investigated further. The fact that the content of SoliQube is adjustable and flexible to fit in all washroom contexts, speaks for wide implementation possibilities. However, the implementation possibilities are also dependant on the technical execution, which is yet to be designed.

Some customers have great preconditions to use SoliQube and might not need to change their washroom environment. It was shown in the evaluation that SoliQube fits washrooms in the premium segment and in businesses with focus on innovation and technology since the interactive part would be experienced as more reliable in these contexts. SoliQube would also be beneficial in washrooms where new people arrive, since it is partly the surprising effect and the perception of the washroom as being innovative that has an entertaining factor. Customers with these preconditions could have great benefits from SoliQube, but customers with reoccurring guests could nevertheless benefit much from the concept although the surprise effect would then occur when new content is used. The suitability also depends on the content of SoliQube and whether it fits the washroom and the main context. The fact that it is possible to change the washroom expression with the content of SoliQube means that different business areas are likely to find SoliQube useful.

SoliQube has only been evaluated in SWR:s in the user tests. It is of great importance that it also can be used in cubicle washrooms since many contexts and business with preconditions as mentioned above also have big volumes of visitors and therefore require cubicles for efficiency. One step in future work is therefore to test the usage and the effect in cubicles to see if SoliQube has potential also in these environments. Although the total effect is not foreseen to be equal in a cubicle washroom, the cubicle design of SoliQube (*see "15.1.1. The usage"*) is believed to elicit a better washroom experience. What is most relevant to test is thus the effect of the impression part; to what extent will the washroom experience be improved with a washroom layout that means less privacy.

20.3. Fulfilment of visionary guidelines

The visionary guidelines aimed to set a direction for the project in terms of sustainability and branding to increase the opportunities for the concept to be a long-term solution. SoliQube is a concept of use design and if it would be developed further, many of the visionary guidelines would be more relevant to evaluate since the visual branding and technical principles would be designed in a later stage of the development. What can be said is that the design of SoliQube has followed the guidelines to the extent that has been possible and where opportunities have been given.

Many of the visionary guidelines have been treated during the development of this project. The use experience has been the main focus of the project and the aspects of trust, safety and integrity have been treated carefully. Further the aspect of user customization has been treated, e.g. in the concept "Connected" but was discarded due to low effect in the washroom environment. However, the communicated message in the INFO execution shall be adjusted to the specific target group visiting the washroom and the main context, so the information should to some extent be customized.

The increased well-being, regarded in one visionary guideline, can be achieved with SoliQube in mainly two ways. Firstly, the well-being aspect of feeling private, comfortable, less stressed and relaxed makes the user experience increased psychological well-being. Secondly, this might also influence the physiological well-being since more people could get better toilet habits. Health could also be sustained through avoiding risk of contamination and infection through touch-free interaction.

How SoliQube should fit into a circular system and how the use of energy and water should be minimized are guidelines that have not been developed or treated much in the project. SoliQube enables a circular usage to some extent since the content is easily changeable, hence long-lasting, and could replace disposable information material. The energy consumption is problematic since the solution will include much technology that is not yet specifically defined, but the usage has been designed to be as energy efficient as possible through the concept being turned off when not in use. These ecologically sustainable aspects however need much more investigations in later stages of the product development process.

Some of the visionary guidelines referred to information and education about hygiene. The communication possibilities of SoliQube enables this communication, but the content was decided to partly be steered by the customer. If these guidelines can be fulfilled, and thus if Essity could benefit from strengthening their brand image through it, is thus dependent on how the responsibility is distributed between the stakeholders. The guideline concerning enabling transparency and trust, might be even more important to make sure that both Essity and the customer can receive branding benefits from SoliQube.

20.4. The stakeholder relations of SoliQube

The stakeholder relations have not been treated much in the usage design, but how the results affect the relations and responsibilities of the stakeholders can be found in the design and the results discussions.

SoliQube let the customer decide much of the content which might have several effects. The customer might want to communicate something that is totally against both the values of the Essity brand but also negative for the user experience. It is thus difficult to determine how Essity should communicate their brand through the product. The concept is based on the elements used and the physical product of the concept should rather be discrete and not take the user's attention. Therefore, the physical product has less potential to communicate the Essity or Tork brand. The Essity logo could be integrated in the interface, but a logo might decrease the positive effect on the user by reducing the congruence. Another option could be that Essity has control of the communicated information, or that Essity only is providing a number of templates to choose from. How these responsibilities should be distributed and how SoliQube can be used in businesses is one of the biggest challenges of the future development of this concept.

If it is decided that the customer shall be allowed to design their own communication, it is something that demands time and effort from the customer which can lead to the decision of not buying the solution. Even if the customers should have the possibility to design, they should not need to administrate everything related. Perhaps SoliQube would imply a service solution, where a third part, or a new competence field within Essity, would be the link between Essity and the customer that provide an interactive design that fits both the customer's and Essity's needs.

The stakeholder relations, the organisational structure and the role of the distributor would then need to change. This might seem as a big step, but since these types of service solutions are growing and will be more and more com-

mon, this might be a necessary change. The changed relations are a part of the transparency and trust that the visionary guidelines are about.

SoliQube could also change the customer range. Essity is mostly selling Tork solutions to bigger companies with a focus on logistics and efficiency, but as the focus of the concept is on the user experience, a new type of customers might be interested. Small private restaurants might find SoliQube very attractive, which speaks for that there should exist a service to offer the customer the right kind of content. As mentioned, the concept fits better in premium segments which also can affect the customer base of Essity as it could appeal to more customers with premium washrooms. In total, Essity might get a changed or extended customer base if launching this type of solution.

20.5. Important future development aspects

This project has, as mentioned, been executed half way through a complete product development process and implies that many aspects need further work. The next large phase would be to start the development of detailed design, meaning that the usability, the technical functions, hardware and components and further evaluation needs to be treated. The total effect of SoliQube relies much on the details such as the content and what is being shown, what sound and scent is being used for the experience, yet, this has not been the focus of the concept development. Knowing that this is essential we pose that this lies in the future development of the concept, and that the general effect from the usage should be designed and evaluated first.

The effect of usage has been treated in the project and because of this the focus has been on the user, so the first step should be to evaluate and verify SoliQube with customers. To make a solution that would be beneficial for all parts, the questions of what weaknesses the customers see and what functions they like the most with SoliQube must be answered. Receiving this customer insight is key to if the concept can succeed or not.

SoliQube is a holistic concept relying on congruence and consists of many functionalities that builds on numerous requirements. This makes the concept complex and the challenge for future development is to maintain and improve the effect of the solution, despite constant decision making and redesigns during development. If changing one parameter of the concept's functionality, it might have large impact on other functionalities. The decision making and further development should thus be done carefully and with constant evaluation to a requirement list to not risk that important functionality fall between the cracks. What should be prioritized is for the concept to enable a congruent washroom impression before enabling extensive functionality.

20.6. Priority of needs in specific functions

The priority of user needs was treated in the needs analysis and resulted in an effect to aim for. In the analysis, it was also stated that the user experience should be higher prioritized than the customer needs. Therefore, the interaction should mainly focus on eliciting a good and fun experience and secondly to give the customer beneficial information. However, the priority of the needs in the specific functions was not treated to the same extent and can differ from the general needs of the washroom visit. It was clear that efficiency was a primary need in general, but that might not be the truth when considering specific functions. If the customer receives valuable information from feedback that additionally elicit a good user experience, this might be of greater importance for the customer than if the visit is efficient. It all depends on the specific situation and business characteristics as described in chapter "*11.1. Business characteristics affecting the needs*". It is thus difficult to determine how to prioritize functions and requirements. Since the priority varies, it is beneficial that SoliQube is flexible so that the customers can adjust the concepts based on their priorities.

21. Discussion of process and methodology

In this chapter, the choices and execution of the process and methodology are discussed in relation to the result of the project.

21.1. ACD3

ACD3 includes multiple system approaches to the development where the first is the socio-technical system in which the environment is viewed from the machine that ought to be developed (Bligård, 2015). The framework opens up for additional perspectives on a higher abstraction level where for example societal values and beliefs, culture, climate and environmental problems may be included. ACD3 can be used standalone or as a part in an extended serial of system approaches to development, and this makes it a flexible framework.

The separated design levels in ACD3 were very helpful to not make design decisions on a too detailed level in the process. The practitioner is guided in what design decisions that should be taken in what order, and by this, central parts and aspects are not missed and it is possible to trace back the solution to the desired effect in a logical way. Here, the different ACD3 matrixes were useful tools to understand what should be regarded and where in the process it is.

It could be experienced as a lot to take in as a practitioner of the framework, with the different abstraction levels and perspectives. The challenges in this project foremost concerned translating the framework into the own concrete activities carried out to extract the design variables. The different ACD3 sheets of the design variables and of the central activities in the development process were the most hands-on guides in the development and essential for succeeding with the process. The question of how the different activities should be carried out depends on the actual project and lays in the expertise of the designer and his/her ability to i.e. choose suitable methods.

The ACD3 activities planning, data collection, analysis, ideation, synthesis, evaluation and documentation is a good structure that permeates all commitments in the project. However, it was difficult to stick to this always independent on the subject of the commitment, as it is time consuming. It resulted in a variation of these activities for different commitments in the project.

The clear connection between design and requirements in the framework made it easy to continuously set requirements for the solution throughout the project process.

21.2. Reliability of needs identification

The concept development is mainly based on the results from the user and customer needs that were discovered in the needs identification. In general, the needs worked as a base to identify the problem, but since the potential users and customers to Essity are much more spread than the range in this project's study, it is possible that only a part of all needs are represented. Obviously a much more extensive needs identification could have been carried out to get more reliable result and analysis. Another option would have been to narrow down the scope of the project so that the collected information could have been more focused.

The general customer needs were difficult to get because the amount of collected information varied. From some customer interviews a lot of useful data was collected and some customers were answering shortly by mail. Therefore, variations of the customer's opinions might have been missed, and some might have been more prominent than others. However, the needs have not been ranked after importance, but only been identified, which may have been a good decision in this situation.

The identification of user needs ended with two male and five female participants. This might have affected the results since there are some natural differences in needs between men and women in washrooms. However, the needs that we hoped to investigate had more to do with personal preferences and the seven interviews showed a saturation in the answers.

21.3. Design of user tests

A lot of the analysis in the project is based on the evaluation and test results. The executions and performance of these tests could in some situations affect the results.

The planning

The recruiting of participants was done at Essity which implied that all participants more or less were biased by being employees. However, they were all working on different divisions and were not involved in the development of washrooms but could be biased by being positive to new ideas and innovations within the company. The participants in the tests were also mostly women because fewer men were interested in participating. The recruiting could have been done more selectively from the start to avoid that more tests than required were performed, where women are overrepresented. However, the main purpose of the tests was not considered to be very affected by the uneven mix of gender.

The planning of the three different tests were affected by various preconditions. Several factors, like the choose of washrooms, order of tests etc, were known to possibly affect the results but couldn't be executed differently. It would have been interesting to let each participant compare the INFO and Theme executions to trigger their minds and get concrete comparisons on the effect, but since the test rig needed to be changed between the tests it was difficult to let people try both concepts. The participants did not perform any tests in a regular washroom without the concept, so no reference could be used to get a measurement on the increased effect. Information of if the concept had an effect could be collected through interviews, but not information of how great the effect was in relation to the ordinary washroom.

The decision to test the interaction part in a separate test was based on the desire to use the Wizard-of-Oz method which required at least one facilitator to be present during the test. Also, the test of the interaction was not deemed dependant on a lifelike washroom visit as for the test of the impression part; the test situation was then desired to be as realistic to a normal washroom visit as possible, to achieve as reliable results of the user experience as possible, and this was not compatible with the desired test procedure of the interaction part.

21.4. Execution of user tests

21.4.1. Technical issues

The fan of the projector was sometimes loud which was noticed by the users and to some extent affected their experience. The scent was also difficult to control over time and could have been of different intensity for the participants. Since interviews were made, some of these execution-related results could be identified, but in some cases, it was difficult to know if the result was a consequence of the test-design or the concept itself.

21.4.2. Explanations and language in tests

In the interaction test the participants didn't understand that the interaction was done through wizard of Oz, which was positive. However, the method also made the participants' performances and experiences dependent on the performance of the moderator. Each of the three gesture-types had a specific interface of different complexity. Some needed much verbal instructions and some interfaces were self-explanatory which might have affected the experience of the participants.

The test of the masking-sound demanded instructions before the test which mean the moderators couldn't explain anything during the test. It was shown that many participants didn't understand the purpose of using the sound, so they had difficulties when answering what they thought about this function. The word "masking-sound" should have been further explained to make sure the instructions and purpose were interpreted in the same way.

In the surveys, the language had influence as well. In INFO and THEME, the words used in the semantic scale were too formally expressed to make it easy for the participants to grasp the words. That might have led to that they interpreted the words differently which makes the result less reliable. In the SAM-survey, the user didn't understand the word dominant and dominated, something that had to be explained each time, and when doing so, there were small differences in the explanations.

21.4.3. Test in unnatural situations

In INFO and THEME, it was difficult to control the behaviour of the participants and it wasn't possible to instruct them along the way or observe the behaviour as they should feel they could use the washroom as usual. Information was collected about what the participants thought of the masking sound, but it was difficult to know what they were referring to since the sound might have differed dependent on the users' behaviors. Some said they didn't hear a sound and some thought it was too loud. The evaluation of masking sound might have been affected by the fact that the participants didn't feel a need for the function, they were just doing as instructed. The response could perhaps have been more positive if the participants had been in a real situation with people outside the washroom, and with the need to carry out their needs. The evaluation of scents had similar problems. Since most participants didn't use the toilet for real they were not exposed to the smells that was problematic according to the user interviews. It would have been interesting to investigate how the scent had been experienced if used in a real environment where it is mixed with other smells in the washroom.

22. Conclusions

This chapter features the conclusions that can be drawn from the project result.

- The current market of communicative washroom solutions targeting user experiences is scarce and scattered. This manifests a gap to the future of public washroom visits that should elicit multisensory experiences, contribute to the user's well-being and extend the customers' branding and communication possibilities.
- What makes a visit to a public washroom a good or bad user experience depends on an array of factors and conditions that are more or less direct, i.e. the user's physical well-being or the environment in which the washroom exist. The attitude towards washrooms and the elicited feelings when using them correlates with the context, standard and state of the washroom. With a communicated higher standard of the main context, the user's expectations on the washrooms increases.
- Carrying out basal needs is a private matter and all users have the desire to be private in the washroom, to varying extents. Placing the solution inside the SWR or cubicle thus create opportunities to enhance the private washroom experience and the communication possibilities which will result in a better user experience. Further, the washroom solution should not draw other visitors' attention to the user but the opposite, i.e. used sound in the SWR should not be experienced as exposing.
- The positive washroom experience for the user is enhanced with level-wise increased fulfilment of needs. The basal needs of both user and customer - i.e. efficiency, functionality and hygienic visit, must be fulfilled to reach better effects, but to reach better effects with the washroom solution the user's psychological and self-fulfilment needs must also be fulfilled along with the customer's secondary needs.
- The user should not be forced to make active decisions and choices in the washroom, the washroom as it is presented should elicit a satisfactory user experience to let the primary purpose of the washroom be in focus.
- The users' experience of the washroom is much affected by its layout and its spatial factor as this has a large impact on the perceived privacy. The effect of SoliQube is expected to vary with the spatial prerequisites of the washroom where the positive effect is expected to be greater in SWR:s.
- The positive effect of SoliQube is dependent on the content of the solution, where congruence between the elements used as well as congruence with the main context is key. The customizable content creates possibilities and implementation benefits but raises the question of responsibility distribution.
- The SoliQube concept can be performed in two different levels – the impression part only or together with the interaction part. This is deemed to make the concept suitable to a larger segment of customers and thus increases the possible customer base.
- If the usage is designed as proposed with SoliQube the presented visual material will be noticed and reach the users in the washroom, thus SoliQube is a flexible way in which different types of customers can reach out with their information or messages to their visitors (that use the washroom).

- The results of the user tests indicate that SoliQube would contribute to the desired effect, they resulted in a positive washroom experience, and furthermore contributed to a private, pleasant and hygienic experience.
    - The experience of several sensory impressions has a positive effect on the user
    - Better user experiences can be reached with sound, scent and image
    - The washroom is a suitable environment to use much stimuli
    - The washroom experience can be improved if the sensory impressions are congruent
    - Visual material such as an image or video can improve the spatial washroom experience
    - The experience becomes positive if the impressions in the washroom contribute to a private feeling
    - The surprise effect can contribute to a positive experience
    - If the feedback through gestures is perceived as fun and hygienic it could increase the willingness to give feedback
    - Users are open to gesture-controlled interaction in washrooms and factors important to address to reach success were identified
- Depending on what abstraction level of the effect “A better user experience and increased communication values in the washroom” that is interesting to address, the evolving guidelines; visionary guidelines, effect-guidelines, function-guidelines and SoliQube guidelines; can function as an aid for continued work.

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APPENDIX

Content

1. Interview templates

01.1 User interview template

Plats

Ålder: Kön:

1. Vad är din generella inställning till toalettbesök på offentliga toaletter?

Arbetsplats/huvudsakliga miljö

2. Vilken typ av miljö brukar du vistas i när du inte är hemma?
3. Hur ser den miljön ut, kan du beskriva den lite översiktligt?
4. Vad tycker du om toaletterna där?
5. Ungefär hur ofta besöker du de toaletterna?

Kontext Miljö:

6. Vilka typer av offentliga toaletter brukar du besöka? Hur ofta?

	aldrig	Någon gång om året	Någon gång i månaden	Någon gång i veckan	Flera gånger i veckan	Varje dag
Träningsanläggning						
Restaurang						
Café						
Klubb/Bar						
Köpcenter						
Biograf						
Hotell/Konferens						
Teater/Konserthus						
Arena						
Nöjesfält						
Flygplats						
Tågstation						
Flygplan						
Tåg/Buss						
Annat...						

7. Om du går igenom listan från början till slut, - Vad är det första du tänker på när du tänker på toaletter i dessa olika miljöer? Kan du beskriva det?

Träningsanläggning	
Restaurang	
Café	
Klubb/Bar	
Köpcenter	
Biograf	
Hotell/Konferens	
Teater/Konserthus	
Arena	
Nöjesfält	

Flygplats	
Tågstation	
Flygplan	
Tåg/Buss	
Annat...	

8. Är det några av dessa miljöer som du helst undviker och har struntat i att besöka fastän du hade behövt det?
    a. Av vilka anledningar?

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9. Har du någon gång undvikit eller avvaktat att gå på toaletten för att *du känner dig besvärad?*

10. Vad för typ av jobbiga/besvärande situationer kan uppstå?
    a. Vad är vanligast att du upplever besvärande?
    b. Brukar du göra något åt det?
    c. Vad i så fall?

Upplevelser

11. Har du haft en negativ upplevelse på en offentlig toalett? (rinnande toalett)
    a. Varför var det en negativ upplevelse?
    b. Vad var det för toalett (Var, hur såg den ut?)
    c. *Om svar att toaletten var smutsig:*
    d. Vet du något besök på en REN offentlig toalett som har varit en negativ upplevelse av en annan orsak?

12. Vet du någon toalett som du tycker är bra och trevlig att besöka?
    a. Varför?
    b. Något annat som påverkade dig och gjorde det till en positiv upplevelse?
    c. (Var? Hur ser den ut?)

13. PROBING! Om det behövs: Hur påverkar olika faktorer din upplevelse av besöket?
    a. Bås/inte bås
    b. Placering av toalett i byggnad? Miljön utanför toaletten?
    c. Stressad eller ej?
    d. Kö/inte kö? Folk utanför?
    e. Ej könsuppdelat?
    f. Humör? Dålig dag?

Beskrivning av besök.

14. Beskriv ett normalt besök på en offentlig toalett där toaletten är i ett bås och handfatet utanför, från det att du öppnar dörren till rummet. Du behöver inte förklara själva toalettbesöket/uträttandet av behoven, utan allt runtomkring som du gör. (jag ställer frågor om vissa moment, som de inte nämner)
15. Om det istället är en toalett i ett eget rum där det finns handfat både inne vid toaletten och utanför, var tvättar du händerna? Varför?
16. Om det finns en spegel inne i toalettrummet, hur gör du då?

Beteende

17. Gör du något annat samtidigt som du uträttar dina behov? Vad?
18. Är det olika beroende på om du ska sitta där länge eller inte?
19. Om du har mycket saker med dig in, vad gör du då?
20. Vad gör du om du går till toaletten själv och det är kö?
21. Är det skillnad om du går dit ihop med någon? Vad?
22. Går du helst till toaletten samtidigt som andra eller själv?
23. I vilka situationer händer det att du börjar prata med folk på offentliga toaletter?
24. Om du har gott om tid, upplever du att du tar längre tid på dig? Varför/Varför inte?

Funderingar

25. Hur medveten är du om andra besökare när du befinner dig på en offentlig toalett?
26. Är andras beteenden något som stör eller besvärar dig?
27. Är du oroad över att andra ska notera vad du gör?
28. Hur brukar du bete dig mot andra? (ögonkontakt? Pissoar?)
29. Vad brukar du tänka på/fundera på under tiden du besöker toaletten?

- Svävar du iväg i tankarna eller är du fokuserad på här och nu?

30. När känner du dig stressad på toaletten? Varför?

- Några andra känslor som brukar dyka upp?

Är det något du tror skulle kunna förbättra upplevelsen?

Finns det något annat som du vill tillägga som vi inte har frågat om?

01.2. Customer interview templates

Företag: Västsvenska handelskammaren
Med Chef Möten och Event

Företag

1. Skulle du kunna berätta lite kort om dig och din roll i arbetet med de nya lokalerna?
    1. Har du varit inblandad specifikt i designen och utformningen av konferensdelen? (inkl val av produkter)
    2. Vad var idén och tanken med utformningen?
    3. Varför ser toaletterna ut som de gör?
    4. Varför har ni valt just denna tekniken?
    5. Varför är det just denna informationen?
    6. Vilka var delaktiga i beslutsfattandet? Vilka intressenter fanns?

Besökarens påverkan:

2. Vad har ni för typbesökare?
3. Hur har slutbesökaren/era kunder påverkat designen?
    1. Hur tar ni reda på vad kunden vill ha?
    2. Vad vill ni förmedla till era besökare?.. Upplevelse?
    3. Vad vill ni generellt ha för input från era besökare?

Utvärdering:

1. Hur tror du att ni gynnas av att ha de här toaletterna?
    4. Har det utvärderats på något sätt?
    5. Har det fått önskad effekt?
    6. Något ni saknar?
    7. Finns det några andra tekniker ni kollade på?

Framtiden

4. Hur tror du att kundernas efterfrågan och krav på offentliga toaletter kommer ändras i framtiden?
    1. Vad kan du se för trender i vad besökare kommer vilja ha?
5. Vad är det bästa med er lösning?

Intervju med Bitr Site manager på Coor

1. Skulle du kunna berätta lite kort om företaget och din roll?
    a. Vad har ni för typkunder? Vilka är era största kunder?

2. Jobbar ni mest med servicelösningarna eller är ni också inblandade i den totala designen och utformningen av lokaler? (inkl val av produkter)
3. Har du någon kommunikation med kunderna?
4. Hur tar ni reda på vad kunden behöver?
    a. Vad efterfrågar era kunder när det gäller service?
    b. Vet de vad de vill ha? /har de mycket åsikter?

Värdeskapande

5. Hur mycket skulle du säga att kundens efterfrågan på service från er påverkas av slutbesökarens behov?
6. Vad prioriterar de olika typkunderna till sina toaletter? Besökare i första hand eller något annat?
7. Vad vill de förmedla till sina besökaren?
8. Frågar de efter något särskilt på toaletter?
9. Vad har du upplevt att kunden efterfrågar för typ av mervärde från er?
10. Har någon kund efterfrågat något som ni inte har?
11. Hur tänker kunderna kring besökarens upplevelser?

Framtiden

12. Hur tror du att kundernas efterfrågan och krav på offentliga toaletter kommer ändras i framtiden?
    a. Vad kan du se för trender i vad kunder kommer vilja ha?
13. Har du någon vision eller tanke om hur framtidens toaletter skulle kunna vara eller fungera?

Kommunikation

14. Tror du att kunderna skulle kunna gynnas/använda sig av någon typ av kommunikations-service till eller med besökare på offentliga toaletter?
15. Vad i så fall?
16. Vad skulle de kunna vilja förmedla?
17. Vad för typer av kommunikationslösningar / produkter skulle Coor kunna gynnas av?
18. Är det något ni saknar?
19. Finns det kundgrupper/ områden där ni inte har så mycket kunder idag men som ni skulle vilja nå?
    a. Har de särskilda behov?

20. Vad för typ av Problem pratar kunderna om?
21. Kunder som efterfrågat nåt extra?

Stylt

Intervju med grundaren

1. Vad har ni för typer av kunder, är det mest Hotel, Restaurang Café?
2. Varför riktar ni er mot de kunderna?
3. När riktar sig de kunderna till er?
    1. Vad har de för utmaningar/problem?
    2. Vad är det kunden frågar efter när de anlitar er?
4. Hur utformas koncepten, eller "den emotionella planen", utgår ni från kundernas vision?
5. Hur mycket är kunden involverad i besluten?
6. Brukar kunderna ha tydliga åsikter om vad de vill ha?
7. Vad tycker kunderna är viktigt att deras besökare upplever?

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8. Arbetar ni något med design av dofter och ljudbilder?
9. Finns det en efterfrågan på kommunikationslösningar?
10. Vilka olika kommunikationskanaler (ex.vis skärmar/ljud/anslag eller liknande) använder ni i era koncept för att nå ut till besökare?
11. Kommunikationen som finns i de olika kanalerna, är det endast envägs-kommunikation från kunden till besökaren, eller är det åt båda hållen?
12. Vilken information vill kunden oftast förmedla **till** besökaren?
13. Vilken data, information eller feedback vill kunden ha **från** besökarna?
14. Har ni stött på problem eller svårigheter kring kommunikationslösningar? I så fall vad?
15. Har ni upplevt att ni saknat en typ av produkt eller lösning?

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16. Hur ser kunden på designen av toalettutrymmena? Är det något de prioriterar?
17. Hur tänker ni kring utformningen av toaletterna i era anläggningar?
18. Är det vanligt att ni använder kommunikation på toaletterna?
19. Har ni sett att det ger resultat/effekt?
20. Vad finns det för trender inom utformning av toalettutrymmen?
21. Ser ni någon potential för feedback som samlas in på toaletterna?
22. Ser ni potential för en produkt vars ändamål är att förbättra upplevelsen på toaletten genom ljud och doft tex?

Vice VD Chalmers Fastigheter

- Vad är din roll i Chalmers Fastigheter?
- Hur är du involverad i utformningen av era lokaler?

Kund, då tänker vi främst på Chalmers. Med kommunikationslösningar syftar vi till produkter, tjänster eller lösningar som möjliggör kommunikation mellan kund och besökare. Med integrerade kommunikationslösningar syftar vi på en inbyggd lösning eller lösning som funnits med i byggprocessen.

Information

1. Hur kan ni hjälpa kunden att kommunicera information i byggnaderna? (Exempelvis information som ska kommuniceras ut till besökare i offentliga byggnader, men också feedback från besökare)
2.
    a. Är kundens behov av kommunikationslösningar något ni tänker på och integrerar tidigt i byggprocessen eller något som kunden själv står för?
    b. Om det sker tidigt, hur görs det i så fall?
    c. Hur fungerar samarbetet med kunden i de här fallen?

3. Finns det några svårigheter med att integrera kommunikationslösningar i byggnader?

Upplevelse/Uttryck

4.
    a. Vad är det som påverkar utseendet av offentliga rum på campus?
    b. Hur beslutas det om vilket uttryck offentliga lokaler ska ha?
    c. Hur beslutas det vilken upplevelse besökaren ämnas få?

5. Är det vanligt att era hyresgäster vill kunna kommunicera en känsla eller upplevelse till besökarna?

6. Hur jobbar man med byggnaden och lokalen för att tillgodose kundens efterfrågan på att skapa och kommunicera en upplevelse? (interiör/ design/ljud/doft/ljus/teknik)

Olika kontexter

7. I vilka typer av lokaler är behovet av integrerade kommunikationslösningar som störst?
8.
    a. Hur prioriteras utformningen av toaletterna?
    b. Har ni integrerat kommunikation/information på toaletterna i något projekt, och i så fall hur?
    c. Ser du någon potential i kommunikationslösningar på offentliga toaletter?

Framtid

9.
    d. Hur tror du att behovet av kommunikationslösningar i byggnader och offentliga rum kommer utvecklas framöver?
    e. Var finns störst potential för utveckling?

Intervjumall kommunikation i verksamheter

1. Skulle du kunna berätta lite kort om verksamheten/företaget och din roll i den/det?

Kommunikation nuvarande situation:

2. Vilka olika kommunikationskanaler använder ni er av för att nå ut till era kunder eller besökare?
    a. Har ni någon kommunikation/information på toaletterna?

3. Kommunikationen som finns i de olika kanalerna, är det endast envägs-kommunikation från er till besökaren, eller är det åt båda hållen?
    a. Vad är det för typ av information som *går ut till* besökaren/kunden? (reklam/instruktioner?)
    b. Vad är det för information som ni *får av* kunden/besökaren? (feedback, användningsdata?)

4. Hur använder ni er utav den fysiska miljön, alltså era XXX (anläggningar/arenor/varuhus/caféer) för att kommunicera till besökaren/kunden? (Vad kommuniceras och hur?)

Kommunikation - behov:

5. Vilken bild vill ni förmedla till besökarna? (Brand Story)
    a. Vad är viktigt att besökarna upplever hos er?

6. Vilken information skulle ni vilja kommunicera **till** besökaren?
    a. Finns det någon typ av information som ni skulle vilja förmedla men inte vet hur?

7. Vad vill ni kommunicera till besökaren genom fysisk utformning, alltså genom design av lokalerna, inredning etc. (design/brand)
    a. Vill ni skapa något mervärde och i så fall hur?

8. Vilken data, information eller feedback skulle ni vilja ha **från** besökarna?
    a. Ser ni någon potential för feedback som samlas in på toaletterna?

9. Ser ni några svårigheter eller hinder med att kommunicera saker till och med besökarna?
    a. (Är det något som inte har fungerat?)
    b. Finns det några problem kopplade till kommunikation i byggnaden?

Toaletter:

10. Hur tänker ni kring utformningen av toaletterna i era anläggningar?
    a. Varför ser de ut som de gör?
    b. Vad prioriterar ni?

2. Observation notes

Chalmers Bibliotek

14/2 -17

Små toaletter samlat i ett "rum" utan dörr nära Bibliotekets Café. Inget tvättrum. Många besökare, majoritet studenter , inte bara från Cafét men från själva Biblioteket. Ej kön-uppdelad toalett.

- *Lyhört*
- *Låg ljudvolym, lite prat utanför*
- *Smutsigt, damm och papper på golvet*

En kille bar med sig en baguette inlindad i plastfolie på toaletten.

En tjej bar med sig en vattenflaska in på toaletten.

Ögonkontakt mellan observanten som stod i kö och en besökare som gick ut från en toalett verkade förvåna besökaren.

Ett antal personer gick till toaletterna med sin mobiltelefon i handen, några hade den i fickan.

Ett flertal tittade på telefonen i kön, andra stod bara och väntade och verkade inte fokusera på något särskilt. En person gick ut från toan med T i handen.

Två personer tog inte i dörrhandtaget till toaletten utan i dörrkarmen när de skulle gå in, slog igen dörren. En med två fingrar på insidan av handtaget. En öppnade dörren med foten.

En person klappade sig på benet (antagligen för att torka av vatten)

Reflektion

Vid mkt folkströmning på toaletterna och köbildande tar nästa person i kön den toalett som blir ledig först, om inte två toaletter blir lediga nästan samtidigt, då kan det hända att man gör ett aktivt val.

Ögonkontakt kan vara besvärande för vissa besökare?

Svenska Mässan

"Megaloppis" 18/2-17. Ligger vid Cafét i hörnet av stor lokal.

Kön-uppdelade toaletter med bås och handfat och speglar i ett tvättrum.

- *Hög ljudvolym*
- *Luktar illa*
- *Smutsigt, papper på golvet, mkt folk på kort tid*
- *6st bås, 5-6 speglar och handfat.*
- *Pappershanddukar och tvålpump (blöta & kladdiga)*

Alla åldrar med ytterkläder och mycket grejer

Två personer liksom smyger in och skannar av rummet efter lediga toaletter, går in på den som är ledig

Två äldre kvinnor pratade högt och tillsynes ostört med varandra men ropade även ut till andra besökare att det fanns lediga bås lite längre bort i rummet. De verkade vara på bra humör och skrattade.

En person till sin kompis påpekade att det är "sjukt" att toaletterna ska vara uppdelade. En annan besökare påpekade också detta.

Ett antal personer tittade i telefonen i kön. En tittar upp då och då.

En person tog upp telefon direkt efter att hon tvättat händerna och väntar på någon.

När det var mycket folk inne i tvättrummet visar besökarna med kroppsspråket vad de vill. Ex.vis var man ställer sig på en plats för att visa vad för saker man vill komma åt, som pappershanddukar eller vattenkranen. Man kommunicerar inte detta i ord.

En person: "står jag i vägen?" -> "Nej då. Ska bara ha lite papper"

3-4 personer var glada, började snacka lite med varandra, om att skjutdörren var öppen och att det blev en lite förvirrad situation.

Många kollade i spegeln framför kranen i samband med handtvätten. En person kollade länge i spegeln innan hon gick in på toaletten men sedan inte vid handtvätt efter besöket.

En person pratar i telefon i kön när det är mkt folk i rummet

En person tvättade händerna utan tvål.

En person lät en annan gå före för att hon såg akut kissnödig ut.

En mamma kammade sin dotters hår i kön medan dottern kollar sin telefon.

En person bet på fingrarna

En person står och fixar frisyren, efter att ha tvättat händerna. Då mitt i rummet. En person kommer in och säger hej. De verkar känna varandra. Tog liten stund innan man hejar. Väntar tills personen kommit tillräckligt nära.

En person säger till sin kompis att det lukar illa.

De som har möjlighet att titta ut ur rummet eller på aktivitet och rörelse gör det. Annars tittar ner i golvet. Många tittar också i en spegel under tiden de köar. Då enbart på sig själva utan att pilla med något.

Många tar handfatet som är närmst från toaletten.

Reflektion

När skjutdörren mellan herr- och damtoaletten var öppen och man kunde gå in på herrtoaletten och använda de båsen (avsiktligt eller oavsiktligt) och vice versa, blev detta ett samtalsämne. Det kan ha varit så att det störde "ordningen".

Är de äldre i lag mer benägna att prata med varandra i toalettmiljö?

Om något utöver det vanliga händer kan det leda till lite "shit-chat"

Man riskerar inte att råka fästa blicken på någon och de skulle upptäcka att man iaktar dem. Därför tittar man ner i golvet eller söker efter rörelser.

IKEA

<u>Kön-uppdelade toaletter</u> med bås och tvättrum. Låg i anslutning till IKEAs restaurang. Blandade åldrar, från pensionärer, föräldrar med barn eller bebisar (i vagnar), till medelålders och yngre vuxna. En spegel framför varje handfat. Ingen bänkyta.

Det spelas musik inne i rummet.

Två besökare hängde sitt ytterplagg på en krok bredvid tvättstället vid handtvätt. En besökare lade sin jacka på barnskötbordet bredvid tvättstället.

Ett barn pratade med sin mamma från ett annat bås om hur det gick med toalettpappret.

Ett barn låg på knä på golvet och kikade in i båsen nedifrån, hon "lekte" därefter med en pall som stod i tvättrummet och ställde sig på den vid handtvätt fastän hon var tillräckligt lång för att nå upp.

En äldre kvinna ställde sin handväska på sidan av handfatet och applicerade läppstift och kammade håret. Hon stod lite vid sidan om handfatet för att inte vara i vägen för någon som ville tvätta händerna. Hon grejar också med sin hörapparat och rättar till den.

En person gick rakt ut från toalettbåset utan att tvätta händerna efteråt

En person skvätte endast vatten på händerna utan att ta tvål

En person ställde sin barnvagn utanför ett annat tomt bås (när lite folk) under sitt toalettbesök.

Ingen besökare stänger båsdörren efter sig utan låter den falla igen

En person torkade av en plastficka med papper i efter att ha kommit ut från båset. Vet inte varför men hon kanske hade spillt på den. Sen la hon den under armen och tvättade händerna.

Konserthuset - Amanda Bergman

Damtoalett med smal passage innan man når tvättrummet. Sedan bås på båda sidor och handfat rakt fram.

Väldigt homogen besökarskara. Vita hipsters mellan 20-35.

Folk står väldigt prydligt på led. Tysta, och många tittar antingen på telefon eller in i speglar.

Kön som bildas byter automatiskt sida i gången. Antagligen för att de som köar vill ha bra uppsikt och inte känna sig ivägen för de som går ut.

En viss ögonkontakt krävs för att man inte ska krocka. Men de som går ut är oftast de som slår ner blicken.

Kö bildas längs med väggar och slutar där man tydligt har en överblick över alla bås. Även om det finns mycket plats kvar inne i tvättrummet.

3. Needs specification list

3.1 Customer needs specification list

category	need	FUNCTION	source (own interviews = I)
Kontextberoende			
experience	products for scent and sounds		STYLT
experience	total concept with scent strategy and sound strategy		STYLT
experience	commnicate a stylish and clean environment		NK
experience	communicate a relaxing atmosphere		NK
experience	interested in products focused on experience		NK
experience	to create a talk-about -effect		STYLT
experience	a good control system of light, scent and sound		STYLT
experience	follow trend: casualisation and experience-intensifying		STYLT
experience	experience-focused products		Coor
experience	communicate information in a fun way		FRISKIS&SVETTIS
experience	communicate an experience in their own premises		Chalmers fastigheter
experience	communicate an experience - something extra		Cinema
experience	exceed the visitors expectations		GOT event
experience	be commersially attractive		Swedavia
experience	have an inspiring atmosphere		Swedavia
experience	relaxed environment		Swedavia
experience	hide strong smells		WS germany
experience	better scent		WS US 535
experience	enjoyable stay for visitor		WS US 536
experience	not disgust the visitor		WS US 544
experience	not expose visitor to bad experiences		WS US 750
experience	provide a good experience		WS US 758
experience	to provide futuristic cool solutions		WS US 760
experience	personalized customization when trying to improve mood		WS US 762
experince	not having weird asociations in the toilet- not make visitors feel disgusted		WS germany
feedback	feedback from visitors, general opinions, complaints		Swedavia
feedback	local feedback		Cinema
feedback	to know if something is wrong		Cinema
feedback	feedback from customers		Cinema
feedback	ideas from customers		Cinema
feedback	Unique and spec feedback on what they like or dislike		NK
feedback	not interested in feedback at toilets		NK
feedback	feedback in washrooms		Liseberg
feedback	to know if the the info has reached the target		FRISKIS&SVETTIS
feedback	to recieve questions from members		FRISKIS&SVETTIS
feedback	to recieve feedback of events, news..		FRISKIS&SVETTIS
feedback	reliable feedback system, result to trust		WS germany
feedback	only reliable feedback		WS US 532
feedback	to know the reason to bad fedback		WS US 541
feedback	feedback		WS US 754
feedback	reliable feedback system, result to trust		WS US 755
feedback	to know the reason to bad fedback		WS US 756
informations	knowing when a problem occurs and when it is over		WS germany
informations	get info about cleaning needs		WS germany
informations	possibilities to make money on ads		WS US 531
informations	department schedules o airports		WS US 545
informations	knowing all cleaning is performed		WS US 745
informations	content information shall match the standard		WS US 746
informations	knowing visitor frequency to be able to plan		WS US 748
informations	communicate if it is vacant or occupied		WS US 752
informations	communicate closest free toilet		WS US 753
information	communicate news and events in department stores		NK
information	communicate news and practical info		Liseberg
information	communicate local news		FRISKIS&SVETTIS
information	communicate events		FRISKIS&SVETTIS
information	info of the week		FRISKIS&SVETTIS
information	show advertises		FRISKIS&SVETTIS
information	to get data and information from devices		Coor
information	communicate where to find what in the building		Chalmers fastigheter
informations	communicate events,		Cinema
informations	communicate internal ads		Cinema
information	communicate cleaning routines		Cinema
information	communicate welcoming information at start		GOT event
information	communicate practical information that fascilitates for visitor		GOT event
informations	communicate business information		WS germany
context	products must fit into concept		STYLT
context	to be able to custimize products		STYLT
context	follow a brand: red thread through everything		Liseberg
context	be able to have conceptualized areas		Liseberg
context	flexibel solution		FRISKIS&SVETTIS
context	fit into WR plus		Chalmers fastigheter
context	adjust to the wishes of renters		Chalmers fastigheter
context	information shall fit context		WS US 547
where	communication in washroom		Chalmers fastigheter

where	placed at toilets ok	Cinema
where	ads & event areas	Swedavia
where	communication connected to washrooms	Swedavia
where	not communicate things in washroom	Åhlens
where	a physical place to communicate	FRISKIS&SVETTIS
where	not ads inside toilet	Coor
when	communicate different information in different stages	Liseberg
when	show information when visitor is most receptive	WS germany
how	a tool to give information	WS US 530
how	provide personal help	Cinema
how	not overdeliver information	Cinema
how	to reach all customers with information	GOT event
how	that the visitor recieves relevant information at right time.	GOT event
how	communicate directly to ticket purchaser	GOT event
how	solutions that enables several graphical profiles	Chalmers fastigheter
how	provide communication by mouth and personal contact.	FRISKIS&SVETTIS
how	a way to reach out to members	FRISKIS&SVETTIS
how	to deliver right information to right person	FRISKIS&SVETTIS
logistics	decrease ques	Cinema
logistics	high availability	Cinema
logistics	provide high availability despite volume peaks	Coor
logistics	knowing visitor frequency have control of flow	WS germany
logistics	show visitor's where to find more toilets	WS US 539
logistics	knowing visitor frequency have control of flow	WS US 542
logistics	knowing witch toilet that is used the most	WS US 543
logistics	not causing longer queues	WS US 546
logistics	solve issue that many are visiting th same toilet.	WS US 749
privacy	not intrude on visitor's integrity	WS germany
privacy	not intrude on visitor's integrity	WS US 538
privacy	visitors to feel private	WS US 757
impressive	have creative and innovative solutions when recieving external guests	Coor
impressive	innovative products	Coor
impressive	follow trends: connected devices, music and lightning	Coor
function	sustainable solution	Swedavia
function	priority: functionality, availability, clean and fresh	Liseberg
function	durable solution	Swedavia
cost	cost to be low	FRISKIS&SVETTIS
cost	low price for property owners	Coor
cost	cost to be low	WS US 761
maintenance	high service	GOT event
maintenance	easy to clean	Swedavia
maintenance	possibility to keep clean despite queue	Cinema
maintenance	easy maintenance	Cinema
efficiency	not being too time consuming for user to plan visit	WS germany
efficiency	not force user to prepare visit	WS germany
efficiency	not demand time from visitor if the effect isn't big enough	WS US 537
efficiency	not force user to use an app	WS US 540
efficiency	not want the visitors to stay for too long	WS US 759
hygiene	not mask bad hygiene	WS US 534
hygiene	not force visitor to touch	WS US 747
hygiene	not mask bad hygiene	WS US 751
safety	not risk someone being locked in	WS US 533
usability	visitors to do as little active choices as possible	WS germany

3.2 User needs specification list

category	need	source (own interviews = I)
Functional		
basal needs	to be able to devocate	KJ H-funktion
basal needs	to be able to urinate	KJ H-funktion
basal needs	to be able to get water	KJ usability
basal needs	to be able to use toilet paper for basic needs	KJ usability
basal needs	to be able to wash hands close to toilet	KJ contamining
physical	to be able to move around	KJ high volume
physical	to be able to get in a que	KJ high volume
physical	to be able to care for kids inside	KJ room/space
physical	To put away personal belongings during washroom visits in a quick and easy way	KJ room/space
physical	to be enabled to move around in the washroom in a functional way	KJ room/space
social	Undvika att inte skapa problem/besvär för andra	KJ hide
hygiene	not contamine clothes or things	KJ usability
hygiene	To put away personal belongings during washroom visits without risking getting them dirty/contaminated	KJ usability
hygiene	high hygiene standard	KJ high volume
hygiene	to touch as little things as possible during the washroom visit	KJ room/space
hygiene	to be able to dry hands	KJ usability
hygiene	not touch anything after washing hands	KJ contamining
hygiene	the toilet to be clean	KJ contamining
hygienic	that the drying is hygienic	KJ contamining
hygiene	to be able to wash hands with water	KJ H-funktion
hygiene	to use soap	KJ usability
hygienic	to see if a surface is clean or not	KJ contamining
hygiene	to avoid bacteria from others	KJ contamining
hygiene	minimize particles in air	KJ contamining
hygiene	to not inhale dirt	KJ odor
communication	To be able to inform other visitors and staff about problems with the washrooms' functionality and/or hygiene	KJ interaction
communication	To be able to solve occuring problems with the washrooms' functionality and/or hygiene yourself	KJ usability
information	to know if something has run out in the washroom before entering/using it	KJ others' behaviour
information	to know if something is broken in the washroom before entering/using it	KJ others' behaviour
information	to be updated of what's happening	KJ behaviours
information	to get feedback if it works	KJ usability
information	to know how long you need to wait.	KJ to que
information	to know which toilets that are free	KJ to que
information	to have something to watch	KJ to que
information	want to be able to identify things you see easily	Hygiene
information	to know How clean it is before entering	Hygiene
information	to encourage people to take care of place	KJ komm
information	to get information of when last cleaned	KJ komm
information	to know when others are visiting the toilet	KJ high volume
information	to know where least people are going	KJ high volume
information	to know where there are free toilets.	KJ high volume
information	Att kunna åtgärda problem anonymt. (meddela?)	KJ hide
information	to know where bacteria is	
information	know if everything is fine and functional	KJ basal needs
information	to know if someone is outside	KJ sound
efficiency	to get dry quickly	KJ contamining
efficiency	Över att det tar lång tid.	KJ hide

privacy	to not show how long one has been visiting	
privacy	to not have people passing by very closely	
privacy	to not see others	KJ privacy
privacy	to not hear others	KJ privacy
privacy	Kunna dölja sin egen skit. (visuellt) Väldigt privat!	KJ hide
privacy	Över att de ska höra	KJ hide
privacy	to not hear others	KJ sound
privacy	to mask sounds	KJ sound
privacy	make sure no one is outside	KJ sound
experience	to be able to listen to own music	KJ sound
experience	to not feel strong unpleasant smells	KJ odor
safety	to not spread particles	KJ hygiene
safety	to perform routines in a safe way	KJ boy/girl
safety	to not being threatened	KJ boy/girl
safety	to minimize risks of sexual harassments	KJ boy/girl
logistics	enough capacity for amount guests	KJ high volume
logistics	to avoid many people at once	KJ high volume

Products

efficiency	Products/services should be efficent to use	KJ usability
hygiene	Products should have clean surfaces and look clean	KJ usability
cognitive	The user should trust the technique/functionality	KJ usability
cognitive	The user shall not be worried about the function, if and how it works or not	KJ Mental mode
cognitive	Products/services should not demand heavy mental workload	KJ to que

Impressions

experience	WR to be clean	Hygiene
experience	to get a fresh haptic impression	KJ interior
experience	to get a pleasant feeling and overall experience of the washroom	KJ interior
experience	to get positive associations	KJ interior
experience	to get a coherent impression(Uppleva ett genomgående tema	KJ interior
experience	to get curious	KJ interior
experience	to get surprised or stunned	KJ interior
experience	to get at least what was expected	KJ interior
experience	to get new impressions	KJ behaviours
experience	to be entertained	KJ behaviours
visual experience	to get a fresh visual impression	KJ interior
visual experience	to get a pleasant lighting experience	KJ light
visual experience	a pleasant light level	KJ light
information	to know if it smells inside toilet	KJ odor

Inner feelings/mental

information	to know how clean/dirty it is	KJ contamining
	to be able to get a break from current activity/occupation	
cognitive/physical	in the washroom	KJ H-funktion
cognitive/physical	to be relaxed and not worry before a washroom visit	KJ Mental mode
experience	keep positive feelings	KJ emotions
experience	to fulfil expectations	KJ emotions
experience	keep good mood	KJ emotions
experience	to get a fresh feeling	KJ contamining
experience	to relax	KJ time
experience	to not feel stressed	KJ time
experience	to be able to relax during the washroom visit	KJ Mental mode
experience	to feel comfortable during the washroom visit	KJ interaction
experience	to feel pleasure	KJ Mental mode

safety	to feel safe when placing items	KJ contamining
safety	to feel safe -> to feel safe among other visitors in the washroom	KJ usability
safety	to not feel jostled /trapped inside the washroom?	KJ room/space
safety	feel safe with other people around	KJ interaction
safety	to feel safe with other visitors around	KJ hygiene
safety	to not be afraid of becoming ill	KJ hygiene
safety	not be worried of diseases	KJ emotions
safety	be safe with people around	KJ emotions
control	to not being forced to use things	KJ to que
control	To be able to choose how to perform the tasks	KJ others behaviour
control	To be able to decide of what to think and do	KJ behaviours
privacy	to have private space,	KJ interaction, KJ others beh
privacy	to be able to be alone	KJ H-funktion, KJ behaviour
privacy	to get a private feeling	KJ room/space
privacy	to not be forced to talk to others	KJ interaction
privacy	to be anonymous	KJ interaction, KJ behaviour,
privacy	to feel isolated	KJ privacy
privacy	not being disturbed	KJ hygiene
privacy	to feel safe that no one is coming in	KJ hygiene
privacy	not feel bad smells neither from one self or other	KJ impact on own behaviour
privacy	to not hear sounds from devocating or urinating	KJ impact on own behaviour
privacy	Inte behöva göra saker där folk kan se en. (i kö)	KJ hide
privacy	Att inte dra uppmärksamhet till sig	KJ hide
privacy	Nobody knows that you are inside	KJ sound
privacy	nobody knows what you are doing	KJ sound
privacy	being discrete and anonymous	KJ sound
social	to not disturb others	KJ hygiene
social	to feel that one is contributing to a better atmosphere	KJ interaction
social	avoid embarassing situations	KJ interaction
social	to avoid eye contact	KJ interaction
social	to not disturb others	KJ interaction, KJ time
social	not causing unpleasantness for others	KJ interaction
social	to be able to maintain one's personal image presented to others in the washroom?	KJ interaction, KJ ioob
social	to avoid social insecurity	KJ interaction
social	to not have to adjust due to others	KJ time
social	to be able to not be affected by others	KJ others behaviour
social	Vill inte att folk ska få förutfattade meningar om en.	KJ hide
social	Undvika att folk ska tycka att man är på ett visst sätt.	KJ hide
social	Inte riskera att någon uppfattar mig som ohygienisk	KJ hide
social	Att inte känna sig stressad för att folk väntar	KJ hide
social	avoid awkward situation	KJ emotions
social	not put others in embarassing situations	KJ emotions
control	to have control over what is heard	KJ sound
comfort	feeling of relief	KJ emotions
comfort	feel comfortable	KJ emotions
cognitive	feeling relaxed	KJ sound
safety	to not being worried by breathing	KJ odor
hygiene	to not feel disgusted or contamined by air	KJ odor
hygiene	feeling of cleaniness	KJ emotions
hygiene	to feel all bacterias are gone	KJ hygiene
hygiene	to feel clean afterwards	KJ hygiene
cognitive	to trust the system	KJ privacy
cognitive	take control over situation	KJ privacy
cognitive	not getting disturbed by outer context	KJ Mental mode
cognitive	to not actively think of what one is doing	KJ Mental mode
cognitive	not worry	KJ contamining
cognitive	Slippa skamkänslan	KJ hide
cognitive	Slippa ångest	KJ hide
cognitive	Kunna använda toaletten utan oro, skam eller ångestkänslor	KJ hide

cognitive	not be ashamed	KJ emotions
cognitive	to not be stressed	KJ emotions
cgnitive	not being irritated of others	KJ emotions
Usage		
cognitive	to be able to perform everything alone	KJ usability
cognitive	to be in control of situation	KJ usability
cognitive	to understand all functions	KJ usability
visibility	to see where actions can be made	KJ usability
logistics	to understand the flow	KJ high volume
physical	not be wearing/carrying all things	KJ usability
physical	to touch as little as possible	KJ usability
physical	to have access to all things from toilet	KJ contamining
experience	to focus on pleasant sounds	KJ sound
comfort	to wait comfortably	KJ to que
efficiency	to be able to be efficient	KJ time
efficiency	to distribute the time as wanted	KJ time
efficiency	to clearly know if it is free	KJ hygiene
efficiency	to be productive	KJ behaviours
efficiency	to be able to talk to friend while waiting	KJ to que
efficiency	to be able to do something while waiting	KJ to que
privacy	perform everything privately	KJ privacy
privacy	to keep distance to others	KJ privacy
social	Att kunna planera sitt besök för att undvika jobbiga situatione	KJ hide
information	to know where to put things	KJ contamining
hygiene	not getting ones stuff contamined	KJ contamining
hygiene	to not wear everything on when using bathroom	KJ contamining
hygiene	to have possibility to clean surface	KJ contamining
hygiene	to not be forced to touch things	KJ contamining
hygiene/social/privacy	To not be forced to see someone elses feces/traces from feces/urine	
hygiene/social/privacy	To not leave any visual trace from ones' feces	KJ usability, KJ ioob
usability	to know how things work	KJ basal needs
usability	understand how to move around	KJ to que

4. Requirement list

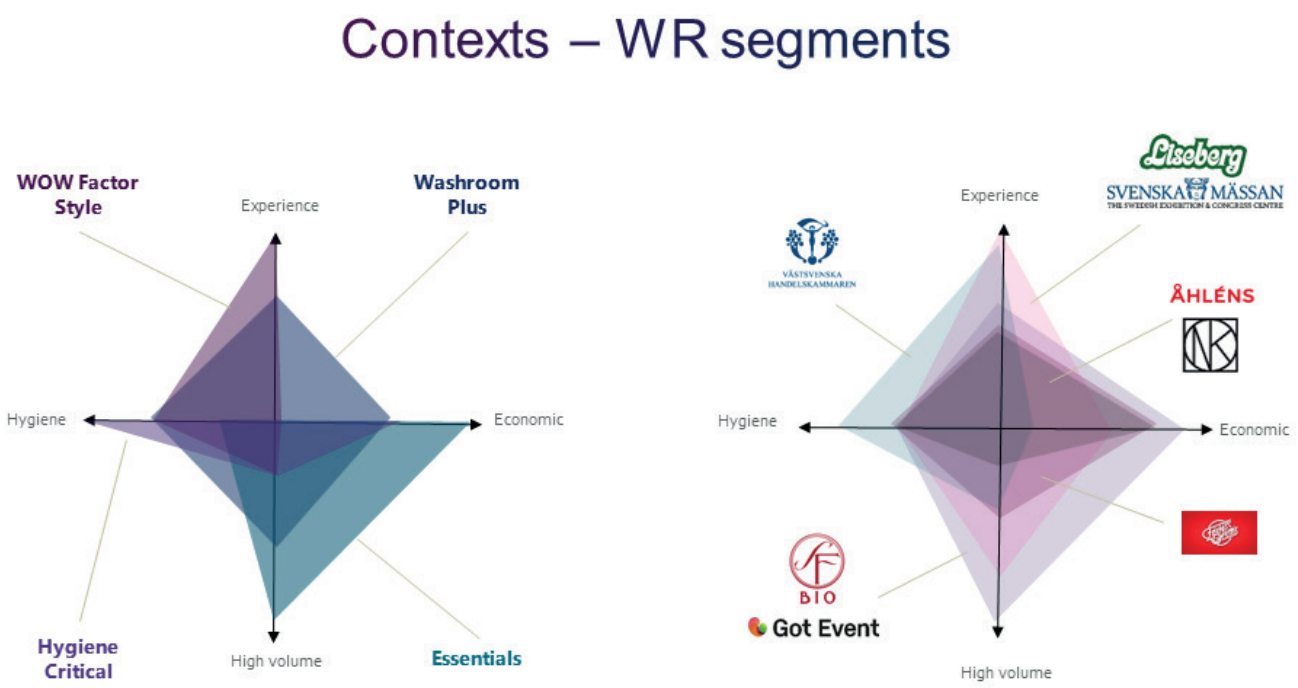
category	source (own interviews = I)	requirement	Notes
		Enable the user to perform the primary tasks and fulfill the basal needs of the	
basal needs	KJ H-funktion	washroom visit	
visual experience	KJ light	not cause disturbing light levels	
Inner feelings/mental			
cognitive/physical	KJ Mental mode	provide a relaxing atmosphere	
experience	KJ emotions	make the user in a good mood	
experience	KJ time	make the user feel comfortable and relaxed during the visit	
experience	KJ Mental mode	make the user customize the room after needs	
safety	KJ usability	make the user feel safe with the product and not feel trapped	
control	KJ to que	enable the user to use the washroom as usual	
privacy	KJ room/space	make the user feel private	folk ska inte komma för nära
privacy	KJ interaction, KJ behaviour, kj ioob	shall be anonymous	
privacy	KJ privacy	shall not put attention of the user so other notice	
		The solution shall be hygienic and not contribute to lower hygienic standard in	
hygiene	KJ high volume	the stall or WR	
privacy	KJ impact on own behaviour	prevent bad smells	
privacy	KJ hide	enable private interactivity	
privacy	KJ hide	to not put attention to the user	
hygiene	KJ room/space	The solution shall not force the user to touch more things than a normal visit	
social	KJ interaction	the use of the solution shall not effect the experience for others	
social	KJ interaction	not cause any socially embarrassing situations	
social	KJ others behaviour	the use shall not be affected by others	
social	KJ hide	shall help to hide information of behaviours	
social	KJ hide	give confidence	
social	KJ hide	prevent stress	
hygiene	KJ odor	not make the user feel disgusted	
cognitive	KJ privacy	shall be trustful	
cognitive	KJ Mental mode	not demand high mental workload from user	
cognitive	KJ contamining	make the user relax and not worry	
cognitive	KJ hide	reduce the feeling of shame	
Usage			
cognitive	KJ usability	enable use from one person	Detta blir speciellt viktigt eftersom det är en privat sfär där man inte vill ta hjälp av någon annan.
cognitive	KJ usability	give the user a feeling of control	känna att man har kontroll över hur dörren kan öppnas och stängas.
cognitive	KJ usability	shall have functions that are easy to understand	Hur man spolar
visibility	KJ usability	shall visually show where actions can be made	
logistics	KJ high volume	the procedure of use shall be clear and easy to follow	
physical	KJ contamining	the solution shall be possible to maneuver from the toilet	
experience	KJ sound	provide pleasant, nice sounds or music	
efficiency	KJ time	provide efficient use	
efficiency	KJ time	shall enable the user to decide of the procedure	
hygienic	KJ contamining	The solution shall look hygienic	
communication	KJ interaction	possibility to give information about occuring problems inside washroom	Ha möjligheten att meddela om något har hänt
information	KJ others' behaviour	give information to the user if something has run out	
information	KJ behaviours	give information of upcoming events	
information	KJ usability	give information to user when scent is added	
information	KJ to que	Inform the visitor or end user of the situation	
information	Hygiene	Not prevent the user from explore the hygiene	
information	KJ komm	shall inspire the user to take care of the stall	
efficiency	KJ contamining	not prevent the efficiency of the visit	
privacy		to increase the feeling of privacy	
privacy	KJ privacy	to minimize the sound of others	
		The solution shall not prevent the user from common behaviours in	
physical	KJ high volume	washrooms such as standing in line or move around	
privacy	KJ hide	shall prevent people outside from hearing what is happening inside	
privacy	KJ sound	shall prevent the user to hear sounds from outside	
privacy	KJ sound	shall give the possibility to mask and hide own sounds	
experience	KJ sound	shall hide the sound inside stall	
experience	KJ odor	prevent bad smells	
safety	KJ boy/girl	to enable safe use	
safety	KJ boy/girl	shall not make the user feel threatened	
logistics	KJ high volume	shall enable many visitors visiting in a row	
physical	KJ room/space	The solution shall not prevent children or elderly from using the WR as usual	

Products			
efficiency	KJ usability	shall be efficient to use	
hygiene	KJ usability	shall look and be hygienic	
cognitive	KJ usability	shall be reliable	Måste känna sig säker på att det är låst
cognitive	KJ Mental mode	be clear about the function and not confuse or worry the user, be easy to understand and use	
cognitive	KJ to que	shall not demand heavy mental workload	
Impressions			
experience	KJ interior	shall enable touch-free interaction	
physical	KJ room/space	The solution shall not conflict with the possibility to get rid of things	
experience	KJ interior	shall contribute to a pleasant feeling	
experience	KJ interior	give positive associations	
experience	KJ interior	be customizable and fit a theme	
experience	KJ interior	surprise the visitor	
experience	KJ interior	shall match the visitor's expectations	
experience	KJ behaviours	give the user impressions/konflikt: not give new impressions	
experience	KJ behaviours	create a fun and entertaining experience	

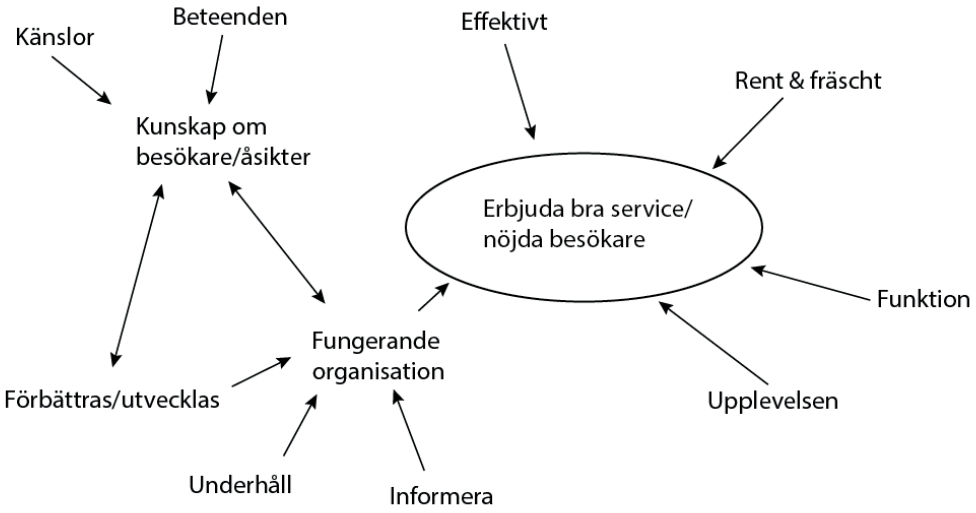
category	requirement	FUNCTION	source (own interviews = I)
		contribute to a pleasant experience give a homogenous experience	
experience		communicate a relaxing atmosphere	STYLT
experience	The solution shall give a coherent experience of sound and scent		STYLT
experience	The solution shall communicate a stylish and clean feeling		NK
experience	The solution shall give a calm and relaxing impression when turned off		NK
experience	the solution shall give information that coheres with the theme		NK
experience	the control of light, sound and scent shall be maneuvered by customer		STYLT
experience	the solution shall be fun to use		FRISKIS&SVETTIS
experience	be commersially attractive		Swedavia
experience	prevent the user from getting bad experience		WS US 750
experience	give the user possibility to choose theme		WS US 762
		enable user to give local, direct feedback confirm to customer that user has recieved information enable users to ask questions enable users to give their opininion enable users to give their own ideas and suggestions	
feedback	contain feedback on general opinions of toilet standard		Swedavia
feedback	contain feedback of the organisation and the stay		Cinema
feedback	communicate error reports from user to customer		Cinema
feedback	communicate suggestions of improvemnets from user to customer		Cinema
feedback	include feedback in an accepted way and inspire the user to interact		NK
feedback	communicate to customer if user has received feedback		FRISKIS&SVETTIS
feedback	communicate reliable and trustable feedback		WS germany
feedback	prevent user from giving unrelevant/wrong feedback		WS US 532
feedback	give the opportunity to motivate the feedback		WS US 541
informations	enable external advertising		WS US 531
information	enable communication of local events, news, practical info, advertising, cleaning routines		NK

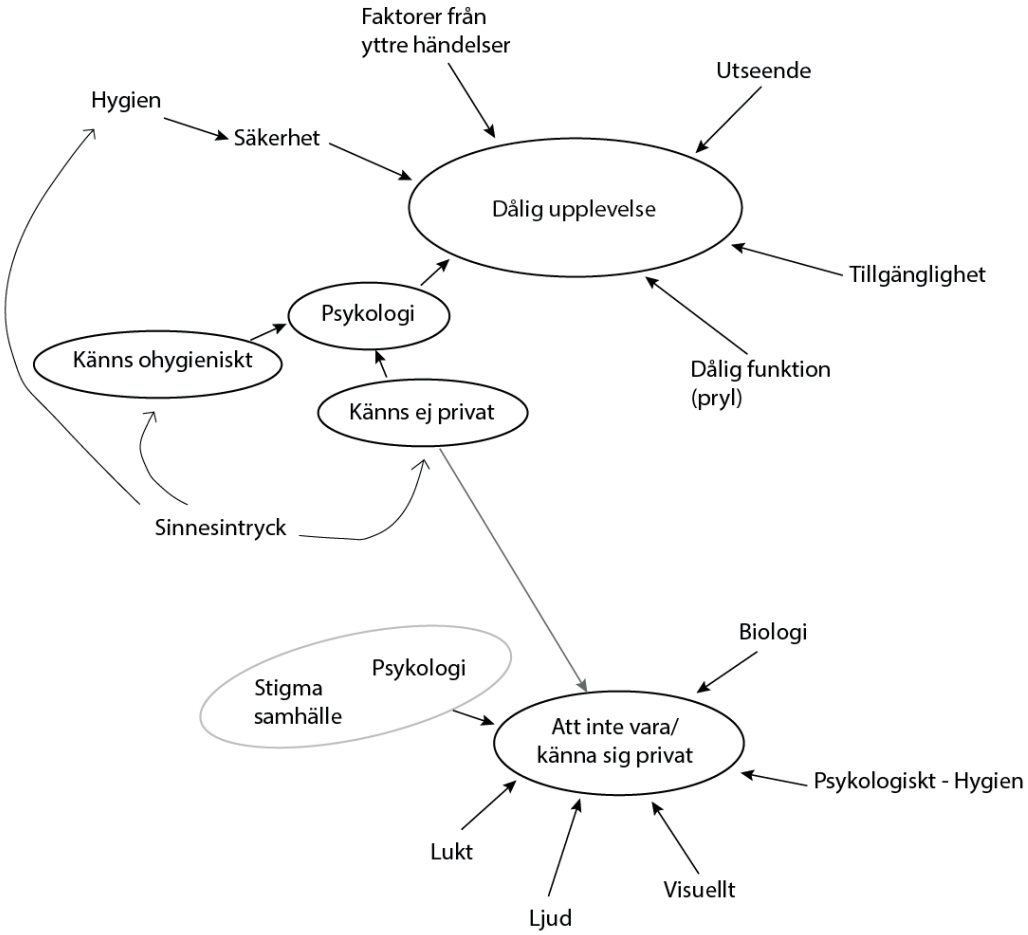
		the solutions shall be adjustable to many contexts provide possibilities for branding	
context	shall fit into TORK's assortment		STYLT
context	enable customization of digital content		STYLT
context	the solution can be used in WR Plus		Chalmers fastigheter
where		enable changing information enable placement according to customer	Chalmers fastigheter
where	enable customer to only communicate the experience		Åhlens
when	provide a changeable interface over time		Liseberg
how	not overload the user with information		Cinema
how	enable several themes and graphical interfaces		Chalmers fastigheter
logistics	not decrease efficiency in WR		Cinema
logistics	enable all people to use the washroom as possible		Cinema
privacy	not intrude on visitor's integrity		WS germany
function	use sustainable materials		Swedavia
function			Liseberg
function	be durable for many Years		Swedavia
maintenance	enable easy cleaning		Swedavia
maintenance			Cinema
maintenance	enable easy maintenance		Cinema
efficiency	enable the user to use the toilet as usual		WS US 537
efficiency	not encourage staying for long		WS US 759
hygiene	enable the user to explore the hygiene		WS US 534
hygiene	not hide bad hygiene		WS US 751
usability	have a low level of active decisions for user		WS germany

5. Customer segment wheel

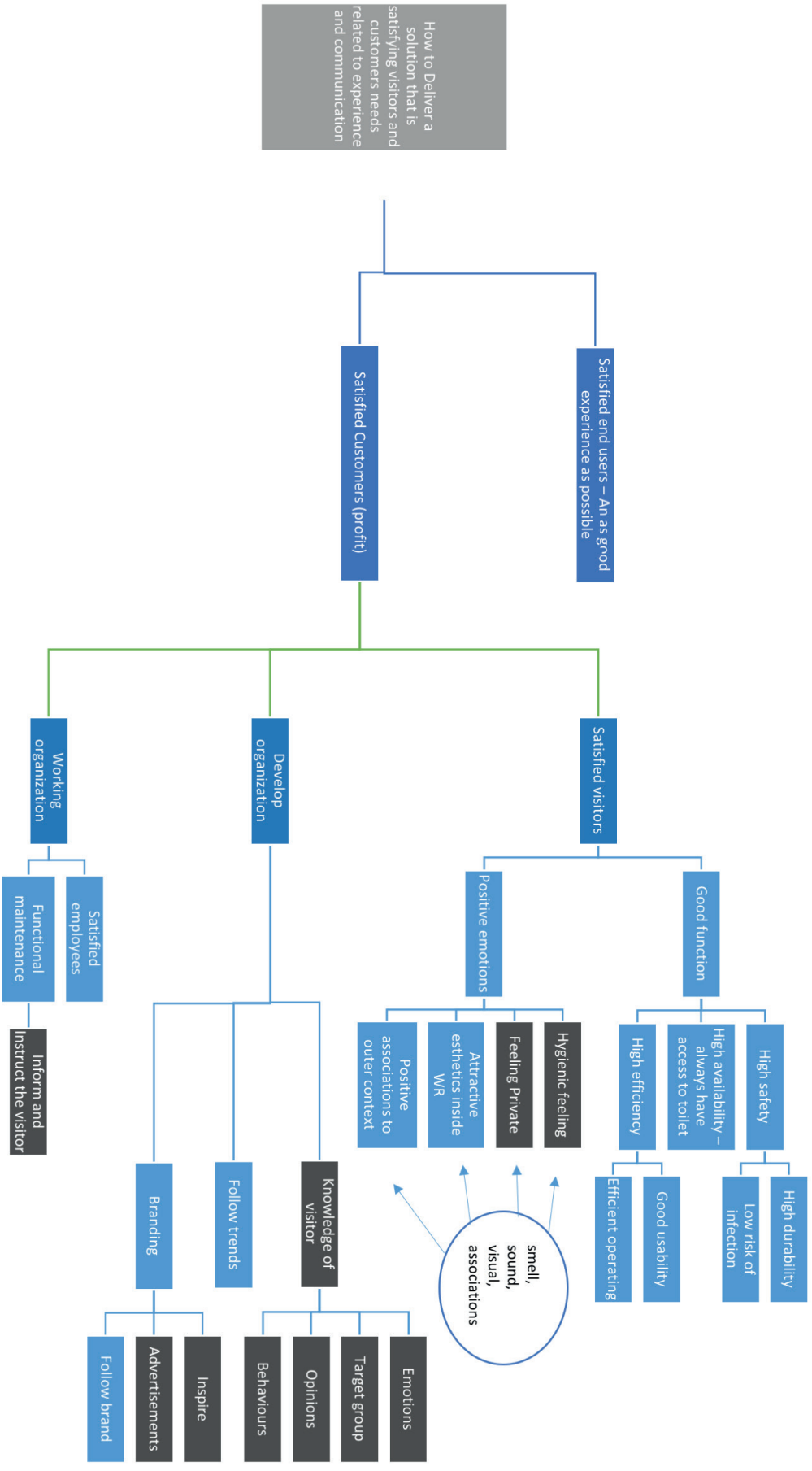


6. Mind map

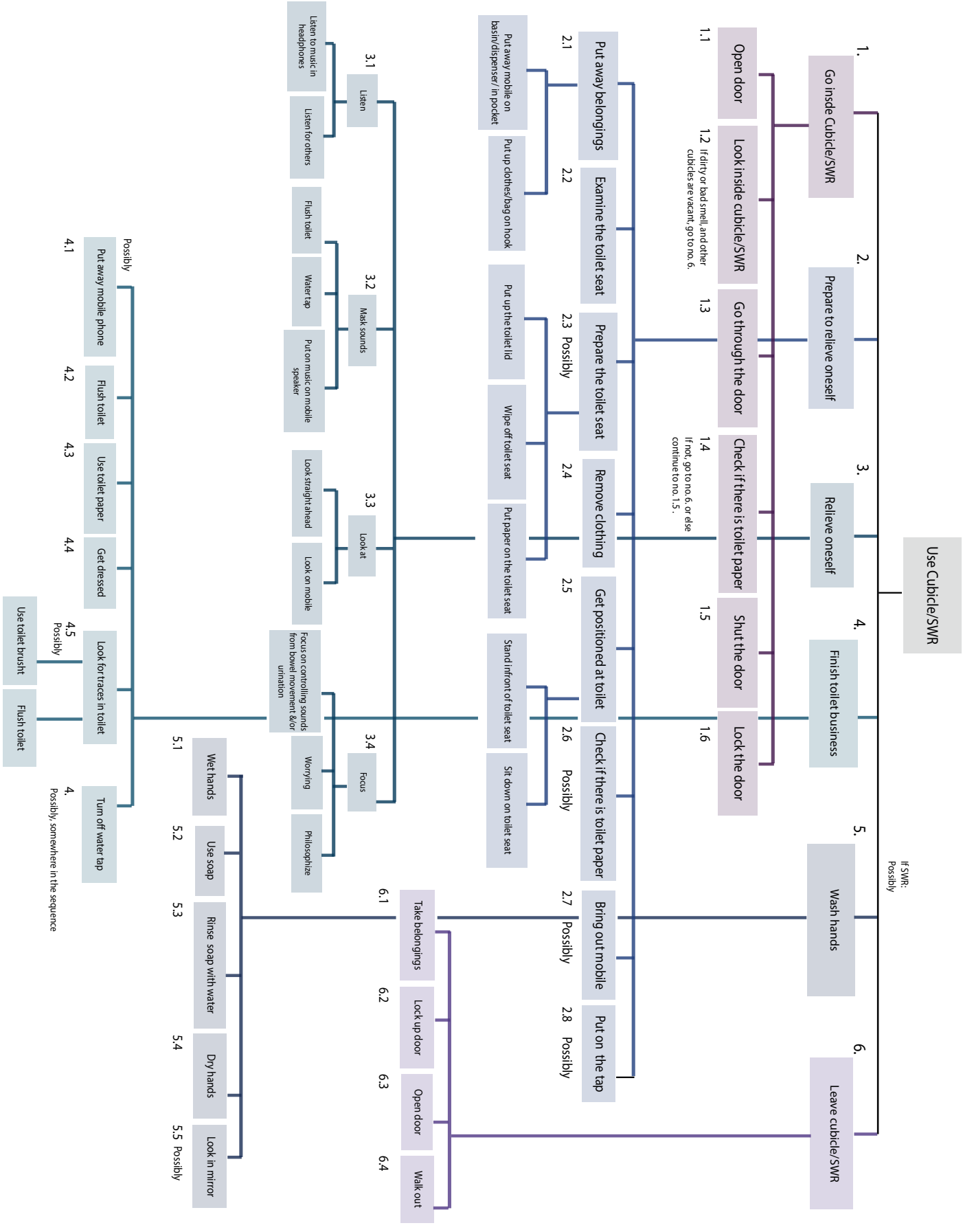

Känslor
Beteenden
Kunskap om besökare/åsikter
Effektivt
Rent & fräscht
Erbjuda bra service/ nöjda besökare
Funktion
Upplevelsen
Fungerande organisation
Förbättras/utvecklas
Underhåll
Informera


Faktorer från yttre händelser
Utseende
Hygien
Säkerhet
Dålig upplevelse
Tillgänglighet
Psykologi
Känns ohygieniskt
Dålig funktion (pryl)
Känns ej privat
Sinnesintryck
Biologi
Psykologi
Stigma samhälle
Att inte vara/ känna sig privat
Psykologiskt - Hygien
Lukt
Ljud
Visuellt

7. Tree diagram



8. Hierarchical Task Analysis (HTA)



What is the total effect of the concept?	importancegrade	1. 360 Expo		2. Privacy Friend		3. Robot		4. Best Cubicle		5. Connected		6. Easy show		7. Mirror		8. Feed Fun			Privacy Friend 2.0		Expo Cube		Best Cubicle 2.0	
End user																								
General																								
Get an aesthetic experience - light, colours, impression	2	3	6	2	4	1	2	2	4	1	2	2	4	2	4	2	4		2	4	3	6	1	2
Get a WOW experience - surprise, curious, entertainment	2	3	6	1	2	3	6	1	2	3	6	1	2	3	6	2	4		2	4	3	6	1	2
Get a private experience - calm, relaxed, comfortable	3	2	6	3	9	2	6	2	6	1	3	1	3	2	6	1	3		3	9	3	9	2	6
																				0		0		0
			0		0		0		0		0		0		0		0			0		0		0
High WR Usage Efficiency	2	2	4	2	4	1	2	3	6	1	2	2	4	1	2	2	4		2	4	1	2	3	6
To be in control	2	1	2	3	6	2	4	2	4	3	6	1	2	3	6	2	4		3	6	2	4	3	6
Hygienic feeling	2	2	4	2	4	3	6	2	4	2	4	1	2	2	4	2	4		2	4	2	4	2	4
Avoid social awkwardness	2	1	2	3	6	2	4	3	6	1	2	1	2	2	4	1	2		3	6	3	6	3	6
Be and feel safe	2	2	4	3	6	1	2	2	4	1	2	3	6	1	2	2	4		3	6	2	4	3	6
Summary			**34**		**41**		**32**		**36**		**27**		**25**		**34**		**29**	**0**	**20**	**43**	**19**	**41**	**18**	**38**
Information																				0		0		0
Give information about:																				0		0		0
Maintenance needed	2	1	2	1	2	3	6	3	6	1	2	1	2	3	6	2	4		3	6	3	6	1	2
Cleaning	1	1	1	1	1	3	3	3	3	2	2	1	1	3	3	2	2		3	3	3	3	1	1
Own opinions	1	1	1	1	1	3	3	1	1	3	3	1	1	3	3	2	2		3	3	3	3	1	1
																				0		0		0
Get information about:																				0		0		0
Clean or not	3	1	3	2	6	3	9	3	9	1	3	2	6	3	9	2	6		1	3	1	3	3	9
Vacant washrooms?	2	1	2	1	2	3	6	3	6	1	2	2	4	1	2	2	4		1	2	1	2	3	6
The social situation	3	1	3	3	9	1	3	2	6	1	3	1	3	2	6	1	3		2	6	1	3	3	9
What is safe/functioning	2	1	2	1	2	3	6	3	6	1	2	2	4	1	2	2	4		2	4	1	2	3	6
																				0		0		0
Summary			**14**		**23**		**36**		**37**		**17**		**21**		**31**		**25**	**0**	**15**	**27**	**13**	**22**	**15**	**34**
Total End user benefits			**48**		**64**		**68**		**73**		**44**		**46**		**65**		**54**	**0**	**35**	**70**	**32**	**63**	**33**	**72**
Customer																				0		0		0
General																				0		0		0
																				0		0		0
Develop organisation	1	1	1	1	1	3	3	3	3	1	1	1	1	3	3	3	3		1	1	3	3	3	3
Strengthen brand	1	3	3	1	1	2	2	1	1	2	2	2	2	3	3	2	2		2	2	3	3	1	1
Functional maintenance	3	1	3	1	3	3	9	2	6	1	3	1	3	1	3	2	6		2	6	1	3	3	9
			0		0		0		0		0		0		0		0			0		0		0
Attract more visitors/Create good reputation	3	3	9	2	6	3	9	1	3	3	9	1	3	3	9	2	6		2	6	2	6	3	9
Satisfied cleaners	2	1	2	1	2	2	4	2	4	1	2	1	2	1	2	2	4		2	4	2	4	3	6
Summary			**17**		**12**		**24**		**14**		**16**		**10**		**17**		**18**	**0**	**8**	**18**	**8**	**16**	**10**	**25**
																				0		0		0
Communication																				0		0		0
Get information about:																				0		0		0
- Opinions	3	1	3	1	3	2	6	2	6	2	6	1	3	3	9	3	9		3	9	3	9	1	3
- Emotions	2	1	2	1	2	3	6	1	2	1	2	1	2	2	4	2	4		3	6	3	6	1	2
- Behaviours	3	1	3	2	6	3	9	3	9	1	3	1	3	2	6	1	3		1	3	1	3	3	9
- Users	1	1	1	1	1	3	3	1	1	3	3	1	1	2	2	2	2		3	3	3	3	2	2
Give information about:			0		0		0		0		0		0		0		0			0		0		0
Events/news	3	3	9	1	3	1	3	1	3	2	6	3	9	2	6	3	9		3	9	3	9	1	3
The company/brand	2	3	6	1	2	1	2	1	2	2	4	3	6	2	4	3	6		3	6	3	6	1	2
Inspire visitors	1	3	3	1	1	2	2	1	1	3	3	3	3	3	3	3	3		1	1	3	3	1	1
Instructions	1	1	1	1	1	3	3	1	1	1	1	3	3	2	2	3	3		2	2	2	2	3	3
Ads	2	1	2	1	2	1	2	1	2	3	6	3	6	3	6	3	6		3	6	3	6	1	2
			0		0		0		0		0		0		0		0			0		0		0
Show information when user is receptive	3	3	9	3	9	3	9	3	9	3	9	3	9	2	6	3	9		3	9	3	9	3	9
Customize content	3	3	9	1	3	1	3	1	3	3	9	3	9	3	9	3	9		3	9	3	9	0	0
																				0		0		0
Summary			**76**		**53**		**85**		**60**		**79**		**69**		**85**		**91**	**0**	**40**	**91**	**42**	**91**	**33**	**76**
Total customer benefit			**93**		**65**		**109**		**74**		**95**		**79**		**102**		**109**	**0**	**48**	**109**	**50**	**107**	**43**	**101**

9. PUGH matrix 8 concepts

What is the total effect of the concept?	importancegrade	1. 360 Expo		2. Privacy Friend		3. Robot		4. Best Cubicle		5. Connected		6. Easy show		7. Mirror		8. Feed Fun			Privacy Friend 2.0		Expo Cube		Best Cubicle 2.0	
Usable for Persona																				0		0		0
Efficient Eric	1	2	2	1	1	2	2	3	3	1	1	3	3	1	1	3	3		1	1	1	1	3	3
Private Pamela	1	2	2	3	3	2	2	2	2	2	2	2	2	2	2	1	1		2	2	3	3	2	2
Hygienic Hanna	1	2	2	2	2	3	3	3	3	3	3	2	2	3	3	2	2		1	1	1	1	3	3
Dreaming Daniel	1	3	3	2	2	3	3	1	1	3	3	2	2	3	3	2	2		2	2	3	3	1	1
																				0		0		0
																				0		0		0
Summary			**9**		**8**		**10**		**9**		**9**		**9**		**9**		**8**	**0**	**6**	**6**	**8**	**8**	**9**	**9**
Implementation																				0		0		0
																				0		0		0
Longlasting solution	3	2	6	2	6	3	9	3	9	2	6	3	9	2	6	2	6		1	3	2	6	3	9
Fast implementation	1	3	3	2	2	1	1	2	2	1	1	3	3	1	1	3	3		2	2	1	1	3	3
Possibility for technical implementation	2	3	6	2	4	2	4	3	6	2	4	3	6	1	2	3	6		3	6	2	4	2	4
Acceptance visitor	3	2	6	3	9	1	3	3	9	1	3	3	9	1	3	2	6		1	3	2	6	3	9
Match SCA's brand	3	1	3	3	9	1	3	3	9	2	6	2	6	2	6	2	6		2	6	1	3	3	9
Summary			**24**		**30**		**20**		**35**		**20**		**33**		**18**		**27**	**0**	**9**	**20**	**8**	**20**	**14**	**34**
Cost			0		0		0		0		0		0		0		0			0		0		0
			0		0		0		0		0		0		0		0			0		0		0
low Cost	3	2	6	2	6	1	3	2	6	1	3	3	9	1	3	2	6		2	6	1	3	2	6
low maintenance	3	2	6	2	6	2	6	3	9	3	9	3	9	2	6	3	9		2	6	2	6	3	9
																				0		0		0
Summary			**12**		**12**		**9**		**15**		**12**		**18**		**9**		**15**	**0**	**4**	**12**	**3**	**9**	**5**	**15**
Suitable Contexts			0		0		0		0		0		0		0		0			0		0		0
Suitable for both high and low volumes	1	3	3	3	3	2	2	2	2	1	1	3	3	1	1	3	3		3	3	1	1	3	3
Suitable for both peak and steady flow	1	3	3	3	3	1	1	2	2	1	1	3	3	1	1	2	2		2	2	1	1	3	3
Summary			**6**		**6**		**3**		**4**		**2**		**6**		**2**		**5**	**0**	**5**	**5**	**2**	**2**	**6**	**6**
			0		0		0		0		0		0		0		0			0		0		0
Segments			0		0		0		0		0		0		0		0			0		0		0
Essentials	1	1	1	1	1	1	1	3	3	1	1	3	3	1	1	1	1		1	1	1	1	2	2
Washroom Plus	3	3	9	3	9	1	3	3	9	3	9	3	9	2	6	3	9		2	6	2	6	2	6
WOW Factor Style	3	3	9	2	6	3	9	3	9	3	9	2	6	3	9	2	6		2	6	3	9	2	6
Summary			**19**		**16**		**13**		**21**		**19**		**18**		**16**		**16**	**0**	**5**	**13**	**6**	**16**	**6**	**14**
			0		0		0		0		0		0		0		0			0		0		0
Businesses			0		0		0		0		0		0		0		0			0		0		0
All-day-event facilities	3	3	9	2	6	1	3	3	9	2	6	3	9	2	6	3	9		2	6	3	9	3	9
Entertaining events	3	3	9	2	6	1	3	3	9	1	3	3	9	1	3	3	9		2	6	3	9	3	9
Shopping malls	1	2	2	1	1	1	1	3	3	2	2	3	3	1	1	2	2		1	1	1	1	1	1
Restaurants, Café, Bar, Club	2	3	6	2	4	3	6	1	2	3	6	2	4	2	4	2	4		2	4	3	6	2	4
Conference, Hotel	3	3	9	3	9	3	9	2	6	3	9	1	3	3	9	2	6		2	6	3	9	3	9
Training centers	2	1	2	1	2	1	2	1	2	1	2	3	6	1	2	3	6		2	4	2	4	3	6
Offices, everyday business	2	2	4	3	6	2	4	2	4	3	6	1	2	3	6	1	2		2	4	2	4	3	6
																				0		0		0
Summary			**41**		**34**		**28**		**35**		**34**		**36**		**31**		**38**	**0**	**13**	**31**	**17**	**42**	**18**	**44**

Scenario Usage in Cubicle (see Storyboard)	1. Outside Cubicle User walking outside looking at the doors. Hears vague music from three other cubicles that fills the entire WR. Can smell a pleasant scent. Because the Qubes are placed in the roof, the user sees and hhears which cubicles that are free to use.	2. Opens the door The user are facing a bit stronger sound and scent, still the same. Is investigating the room by looking around in a light environment, checking everything is ok.	3. Locking the door A picture is shown on the inside of the door. The picture is possibly shown over all door but focus/information above the handle. A colour is fading in giving the room a slight colouring light. User is taking off clothes and preparing the visit.	4. Sitting down on toilet The picture has become big and is hinting that interaction is possible. The user puts up the hand to begin interaction.	4.a Giving Feedback The user gets questions and can quick and efficient give input. (There is also a possibility to give complaints directly sent to cleaners?)	4.b Mask sounds	4.c Closing down the window	5. End of visit. Closes the lid, take all things and walk out of the cubicle	
Wanted User Emotions	Feeling calm and relaxed, not hearing the others very well and gets the pleasant scent that fills the room.	It looks hygienic and smells good.	Aha, something is happening! Oh wait it grows. Interesting and cool, but not scary since it fades interested, curious, excited, safe, in control, surprised but not scared.	Fun and innovative to test and navigate. What a nice atmosphere, feeling relaxed, calm, hygienic, natural, fresh, safe and not watched	hygienic way of giving feedback, easy and quick to use entertained, contributing to a good thing satisfied	private, isolated, anonym, not annoying others less exposed, calm, relaxed safe, in control	in control, calm, seen and respected	Happy with the visit, wants to tell the friends to visit too!	
The projected image inside cubicle:	Nothing. Projection off	Nothing. Projection off	starts to show a circle or similar and slowly grows to a full scale picture. It fades in/is animated into the start screen mode.	Hint how to interact. The interactive choices are visible in a discrete way to not disturb the impression. All possibilities are visible	Slutar med ett tack			The projection is showing the current image until the door is unlocked. Then it Shows/fades into a message of Thank you in a smaller area just as in the beginning!	
picture of interface									
Gestures or interactions					choosing alternatives.				
What is going on technically in the Qube:	Alt 1 Long time since last visitor: Nothing. Power off Alt 2 Someone recently used the Cubicle: In stand by mode, Qube on, playing sound and have active scents but no active projection or gesture control.	Alt1 The product starts and sound is turned on low volume immediately. Scent is added when needed from here. Alt 2 Product is in standby mode and nothing new happens. Sensor is though registrating movements.	A sensor is registrating the locking and tells: the projection to start the light diod to slowly increase lumination. Turn on gesture control	sensor registrates and reads movements and the choices of the user.		if mask by volume: the volume of music is turned up as the user decides through interaction. Is keeping that volume. If mask by sudden sound: the sound will be played as it normally sounds. Preferably around 10 s.	the window and projected image is reduced to a small picture with black background, so the projection is still on. The sound is muted.	The Qube registrates the sensor signal from the lock when it is used and change projection image to the smaller thank you screen as well as fading out the sound and light. The thank you screen is shown for 20 s maximum	The Qube is turned off (stand by) when the sensor not has received any motions for the last minute.
Technical interplay between all Qubes in the WR	Other Qubes are playing the same music since people are inside 3 cubicles. All Qubes that are turned on are connected by WI-FI to one common computer.	the sound is synced and exactly the same as in other cubicles.	nothing more happens with the interplay.						

10. Usage map

11. Sustainability framework

Syntes

Problem: Framtidsvision

- Identifiera och beskriva problemet med att produktutveckla utan att se långsiktigt. (GAPET) som måste lösas för att nå en framtidsvision.

Projektet är väldigt öppet och ska resultera i en innovativ lösning där ny teknik ska undersökas. Risken med nya tekniska lösningar är att de är utvecklade efter gamla system och behov, vilket gör att de blir omoderna snabbt trots modern teknik. I detta projektet är det viktigt att skapa en långsiktig lösning som passar in i hållbar framtid.
Problemet i denna fasen är därför att det är lätt att fastna i en lösning som löser dagens användarproblem men inte går att använda i ett långsiktigt perspektiv. Problemet är således att vi inte vet vilka behov som behöver fyllas om 10-20 år och vad som krävs för att något ska anses hållbart även i det långa perspektivet.

Struktur: Framtidens Situation, kontext, användare och intressenter

- Identifiera och beskriva kommande förändringar av användning, användare, kunder, situationer, miljöer relaterat till washrooms
- TRENDER: Hur kommer framtiden se ut enligt trender?

Vad är det för hållbarhetsaspekter som värdesätts i en framtida lösning?
Undersöka trender på hållbara utveckling (Nature trends and Economy trends:)

- kommer gå åt cirkulära system, det kommer krävas i framtiden. Circular economy kommer att vara en självklarhet i framtiden.. Företag måste ta tillbaka sina produkter och återanvänder, återvinner de. Företag har mer ansvar för och bättre kontroll på sina produkter.
- IOT kommer öka och kan också vara en fördel för miljön - passar cirkulära modeller och kommer hjälpa för att uppdatera produkterna. Agile (lättrörliga) processes.
- Man kommer ersätta fysiska produkter med service istället. Minska antalet fysiska produkter. T ex att kunder hyr produkter för att ge företag mer kontroll. Leasing och pooler kommer öka. Shared economy

Kommer hållbarhetsaspekter konflikterna med andra värden?

- Ökad tillgång för fler användare kan innebära smutsigare toaletter vilket då innebär mer underhåll.
- IOT tar bort mängd fysiska produkter och minskar materialåtgång, men energikonsumtionen kommer istället öka vilket är negativt.

Undersöka hur SCAs kundsegment kan förändras och hur det påverkar lösningen.

- SCA har i nuläget business to business verksamhet inom Tork och det kommer behållas då det är företag av olika slag som är i behov av deras lösningar. Privatpersoner är inte en framtida kundgrupp
- SCAs kontrakt bygger på att de levererar en helhetslösning med tillhörande papper. Skulle papperindustrin förändras och papper användas mindre pga hållbarhetsskäl kan systemet komma att ändras i och med att produkterna gör det. Kunderna skulle troligtvis fortfarande vara företag.

- Idag sker mycket genom distributörer som är en mellanhand. Men i och med att produkter förändras och service blir en del av SCAs produkter kommer man allt närmre slutkunden och distributörens roll förändras. Det är viktigt att behålla den goda kontakten med distributörerna vara lyhörda och reflektera över vad nya produkter kommer innebära för alla intressenter.
- Ett ökat fokus på service kommer säkerligen dra till sig fler kunder och locka inte bara stora kunder då fler kan se ett mervärde i att få tillgång till en service. I nuläget har SCA mest logistiska servicelösningar som främst är intressant för stora kunder, men upplevelselösningar eller besökarbehovsbaserade services skulle fler kunder kunna dra nytta av.
-

Beskriva hur framtida användare och användning (av offentliga utrymmen, fokus på professional hygiene solutions) kommer ställa krav på lösningar i framtiden. (Societal and well-being trends:)

- Användare förväntas få personligt anpassad information. Eftersom mängden information ökar kommer man också sålla på ett annat sätt. Därför tar man bara in info som är specifikt relevant. Reklam kan därför gå ännu mer åt det personliga hållet.
- Enligt framtidsforskning spås IT-lösningarna bara öka och människorna vänja sig och anpassa sig efter det. Dock ökar också kraven på att tekniken är oerhört relevant, snabb, felfri, och effektiv. Om de kraven inte uppnås finns risken att man väljer bort den tekniken. Man blir helt enkelt mättad på ny teknik och kommer bara använda det allra bästa. Allt överflödigt kommer bidra till en antieffekt.
- På samma sätt kommer människor kräva att tekniska lösningar anpassar sig efter individuella behov. Personer vill inte känna sig styrda eller kontrollerade, så teknik ska inte anta saker utan vara hjälpsam, tillmötesgående och inte styra personers beteende. UI ska bete sig som en tillmötesgående människa (boken about face).
- Ny teknik med exempelvis igenkänning, customisation, kommer ev upplevas som integritetskränkande. Speciellt till en början innan människor vänjer sig. I längden kommer övervakningssamhället troligtvis accepteras, men det kommer vara ett debatterat ämne under lång tid. Tilliten till kund är därför superviktig! *http://www.regeringen.se/contentassets/37b1bcc07982467c9fd46d2a4bfd3f4f/underlagsrapport-1--informationssamhallet-i-framtiden-2020-2040*

Funktion: Skapade värden ur ett hållbarhetsperspektiv

- Beskrivning av hur vår lösning ska påverka hållbarheten i världen.
- Specificerade förmågor och värden som lösningen ska ge utifrån en hållbar framtida situation.
- VISION: Vad krävs för en hållbar framtid?

Beskriva hur en hållbar framtid i ett washroom ser ut utifrån grundpelarna i backcasting: well-being, nature, economy och society.

The future washroom from societal aspects:

- All people are empowered by having access to education and information about hygiene and how to prevent spreading diseases.
- The society shows trust in the individual, lets the individual be free and given the right to make own decisions.
- The individual feel trust in the societal system but not controlled
- The societal system empowers people to use the washrooms on the same conditions. The balance of power between the stakeholders; users, cleaners, customers etc is equal and fair.

The future washroom from Well-being-aspects:

- All people have equal rights to water and sanitation and to fulfil their basic needs. The washroom is an inclusive space for everyone to access, independent of gender, economic wealth or disabilities
- The washroom should feel safe, be sanitary and not jeopardise one's health
- A washroom visit should not result in the visitor experiencing discomfort, irritation, worry or unease
- A washroom visit should lead to increase of one's well being
- The user is able to get a pleasant experience through
    - complete fulfillment of the main goal of the visit (use the WC)
    - the washroom being and feeling fresh and sanitary
    - opportunities to customize and adjust the use after need.
- The visitor should able to be optimistic about society taking responsibility for the future

The future washroom according to nature

- The waste in the washroom shall be well taken care of and be included in a circular system
- All products shall be produced and manufactured without man-made waste
- Not use water and energy in a way that could harm biodiversity, eco-systems or exceed the regeneration capacity

The future washroom from economic aspects:

- The washroom shall provide trust and transparancy between the stakeholders, (such as information and communication between and to end users).
- The wellbeing of the visitors shall drive the development of the system instead of economic reasons.
- The health of the washroom's economy is based on the well-being of the visitors rather than on the economic growth based on monetary value.

Aktivitet: Förutsättningar för att nå målet

- Beskrivning av hur samhället och befintliga strukturer behöver ändras för att vi ska nå en hållbar framtid hållbarhetsvärden skapas.
- Beskrivning av hur alla intressenter behöver förändras/göra för att nå dit.
- Kan strukturerna ändras?

- Vi kommer inte kunna påverka samhällsstrukturen i stort och därför ska inte det behöva förändras för att lösningen ska fungera. Den ska vara lika genomförbar här och nu och fungerar bra i dagens samhälle.
- Intressenterna behöver vara medvetna om hållbarhetsaspekten för att de ska förstå värdet i att satsa inom det området, men det krävs ingen stor förändring då allt fler har det fokuset.
- Strukturerna behöver inte ändras utan bara fortsätta utvecklas. Dock bör hållbarhetsutvecklingen inom IT-sektorn ta större plats för att det ska tas på allvar.

Realisering: Möjligheter och realism

- Vad är rimligt att vi lyckas med inom projektet?
- Beskrivning av organisatoriska aspekter och marknadsaspekter
- Analyserade existerande lösningar och strategier
- Beskrivning och strategier för hur gapet kan fyllas och hur man kan gå tillväga för att nå dit.

För att nå en hållbar framtid måste företaget i stort hänga med. Vi kan inte utveckla något som inte följer det existerande brandet.

Beskriva hur SCA arbetar med hållbar utveckling just nu.
Vad strävar SCA mot utifrån brand, core values, visioner...

- I och med uppbrytningen av företaget kommer man tvingas jobba ännu mer på att behålla sin position som ett ledande hållbart företag trots att man förlorar skogsargumentet. Då måste man jobba ännu mer framåt, men det är inte helt klart hur det ska göras. (och blir för mycket att ta reda på i detta projekt)
- SCAs hållbarhetsstrategi: The goal is to simplify and improve the lives of millions of people and the core values are respect, excellence and responsibility. The sustainable flagships seem to be from TENA when looking at the website. Tork is not the greenest brand that SCA has. Easycube is mentioned from Tork as a sustainable innovation.
- SCA talks about social responsibility in their choice of partners, and a lot of social responsibility for the employees rather than society in general.
- They are working a lot with education and spreading their knowledge about hygiene to increase wellbeing which includes the availability of water. (SCA off web page)
- Framförallt återplantering av skog till pappersmassa-produkterna. Pappersprodukter med bra absorptionsförmåga för att minska antalet man måste använda, lösningar som är platseffektiva under transport, cirkularitet av pappersservetter i AfH Professional Hygiene, robust konstruktion av dispensrar som är hållbara för slitage, smarta service-lösningar för Tork som innebär effektiv städning och underhåll. (Annie)

- Det största fokuset för Tork är på pappret i sig då det är där den största inverkan på klimatet finns. Dispensrarna är ett litet problem. När det gäller service är man fortfarande väldigt grön på området och jobbar mer med effektivitet än hållbarhet. Men vill utvecklas. Man jobbar en del med material i komponenter och är alltid snabba på att följa regler och riktlinjer i det långa loppet. Energi för IT-lösningar är inte fokus och cirkulariteten är inte genomarbetad specifikt.
- Tork som brand strävar mest åt att göra smarta lösningar för professionals och fokusera på att förbättra vardagen och wellbeing för deras kunder. (Peter)

Undersöka vad som är väsentliga hållbarhetsaspekter för vårt projekt.

- Eftersom det ekonomiska systemet är som det är kommer growth driva utvecklingen oavsett vi vill eller ej, och produkternas framgång kommer bero på inkomster och inte välmående. Däremot finns intressanta ekonomiska aspekter i form av transparens mellan stakeholders, något som vi kanske kommer lösa!
- Den viktigaste miljöaspekten är energi-frågan och cirkulariteten av produkten när det gäller material och eventuella elektriska komponenter. De miljömässiga aspekterna (nature) är viktiga att sträva mot och försöka komma så långt som möjligt men vi kommer inte lyckas nå hela vägen då vi utvecklar en industriell produkt.
- När det gäller societal aspects är det viktigaste att vi ser till individens rätt i samhället och att systemet inte ska kontrollera människor. Vi kan också dra nytta av att alla ska ha rätt till utbildning och kunskap.
- Det område vi kommer beröra mest är troligtvis upplevelseaspekten i well-being eftersom vi utformar en lösning som ska gälla i miljöer med redan god standard och ständigt energieffektiviserade lösningar. Det är helt enkelt inom att folk ska kunna känna sig glada, trygga, välkomna, rena, nöjda och positiva till washroom, som vi kommer kunna göra mest hållbarhetsskillnad.
- SCAs core values är också de väldigt kopplade till well-being - ännu en anledning att fokusera på det området. Även om Tork har ett fokus på service och att underlätta för användarna är Tork-brandet mer fokuserat på effektivitet och produktivitet för kund än hållbarhetsaspekterna (alltså well-being) för användarna. Kan vi få in mer fokus på slutanvändarna för att följa SCAs brand i stort är det bara en fördel.

Strategi:

Strategin för fortsatt arbete är att identifiera de hållbarhetskriterier som passar SCA och vårt uppdrag. Dessa ska sedan dels vara underlag för krav på området, men också finnas med som visionära mål att följa under utvecklingsarbetet.

Hållbarhetskriterier som passar SCAs brand och vårt projekt och som vi vill uppfylla:

The future washroom from societal aspects:

- All people are empowered by having access to education and information about hygiene and how to prevent spreading diseases.
- The society shows trust in the individual, let the individual be free and given the right to make own decisions.
- The individual feel trust in the system but not controlled

The future washroom from Well-being-aspects:

- The washroom should feel safe, be sanitary and not jeopardise one’s health

- A washroom visit should not result in the visitor experiencing discomfort, irritation, worry or unease, but lead to increase of one's well being.
- The user is able to get a pleasant experience through opportunities to customize and adjust the use after need.
- The visitor should able to be optimistic about society taking responsibility for the future

The future washroom according to nature

- The waste in the washroom shall be well taken care of and be included in a circular system
- Not use water and energy in a way that could harm biodiversity, eco-systems or exceed the regeneration capacity

The future washroom from economic aspects:

- The washroom shall provide trust and transparency between the stakeholders, (such as information and communication between and to end users).

Kravsättning

Identifiera och sätta upp hållbarhetsriktlinjer för projektet

Välj ut de viktigaste kriterierna och omformulera till krav. Sätta de ramar som utvecklingsarbetet ska verka inom. Kriterierna ska vara en lista på visionära riktlinjer som vi vill uppnå. Kriterierna i sig behöver alltså inte uppfyllas, men kraven ska.

Krav (Riktlinjer):

- The individual should feel trust in the system but not controlled
- The solution should contribute to increased knowledge about hygiene
- The solution should be and feel safe
- The solution should not jeopardize one's health
- The solution should lead to increase of one's well-being.
- The solution should enable user customization
- The solution should give a pleasant use experience
- The solution should inform the visitor of its benefits and effect on sustainability
- The solution should be energy- and water-efficient
- The solution should aim to be a part of a circular system
- The solution should enable transparency and trust between stakeholders.

Utvärdering

utvärdering av att problemet, behoven och systemmålen är korrekta

- Utvärdera om de uppsatta kriterierna är väl förankrade och relevanta för projektet samt hur de kan appliceras i fortsatt arbete.
- Fundera på:
    - Är det ytterligare någon hållbarhetsaspekt som behöver tas upp?
    - Har nya användare, intressenter eller kontexter uppkommit?

  distributörens roll - Ev kommer kunderna förändras - även kolla på mindre. manager, säljare? Underhåll av produkten/systemet? Operatör?
    - Vad måste vi göra nya studier av?

12. Use design concept workshop results

Use Design Concept Workshop results

Best Cubicle 2.0, Privacy Friend 2.0 och Expo Cube

Utvärdering med besökare.

Koncepten förklarades med hjälp av boards, där handskisser kombinerats med bilder från internet för att förmedla användning/upplevelse/händelse/funktioner. Ett koncept presenterades åt gången för två deltagare, och deltagarna fick komma med spontana kommentarer och tankar efteråt. Konceptet diskuterades några minuter och sedan gick vi vidare med nästa koncept. I slutet fick deltagarna resonera om vilken de tyckte hade varit mest värdefull för de, samt rangordna de.

Privacy Friend 2.0

Group 1

- Viktigt att uppmärksamheten inte dras till sig/ sitt bås eller SWR.
- Hellre att de utanför båsen i tvättrummet fokuserar på ngt annat, har uppmärksamheten på något annat -> mer trygg inne i båset/SWR
- Olika användare upplever maskeringsljud olika – vissa tycker att vetskapen att man döljer sitt ljud är lika besvärande -> skulle inte använda det maskeringsljudet.
- Spolningsljud är inte det bästa, det är ett toalettljud som förknippas med ditt bås. Hellre ha helt andra ljud som inte är relaterat.
- Förslag på en vattenfontän som överröstar
- Viktigt att tänka på alla aspekter av att avslöja saker. Kan folk räkna ut något om dig genom dina val? = inte anonym!
- Trevligt med en överraskande effekt om den inte är överväldigande utan bara" lite trevlig"
- Känslan av privathet kanske inte är det viktiga -> Det gör inte så mycket att man hör andra så länge de inte hör mig.
- **Vill inte bli tvingad att styra för mycket.** Man blir osäker och otrygg av att fatta beslut utan underlag eller tidigare erfarenhet. Bättre att det är **något konstant ljud**. --> Kontroll över situationen hjälper inte alltid. Man kan ha kontroll men ändå tycka något är väldigt jobbigt.
- **Musik i hela WR:et är bra,** otrevligt när det är helt tyst.
- Ganska ovanligt med doft i WR, kan göra att det känns mkt fräschare, påverkar hela upplevelsen positivt (ex. Mc Donalds)
- **Vill inte ge feedback i tvättrummet**

Group 2

- Tror inte att det kommer att fungera med ljud från alla båsen, tror att det kommer bli rörigt
- Viktigt att det är enkelt och man förstår hur det funkar när användningsområdet är så nytt
- Kanske **bara kan ha informationen** och inte maskeringsljudet
- Skulle kunna använda maskeringsljudet om man lärde sig hur man gjorde
- Är en sån grej, a**tt om det finns överallt så kan det fungera och bli accepterat**

Summary

- Effekten att få användaren att känna sig privat har vi kommit fram till är svårt i bås för att de är så öppna. Att använda maskeringsljud kommer inte att vara tillräckligt för att uppnå den effekten. Om utförandet lyckas tror vissa ändå att det kan ge mest effekt.
- Kan ta tid innan man accepterar en sån här lösning. Behövs iterativ utveckling och mycket måste stämma om det ska fungera. T ex rätt ljud, förståelsen, antalet funktioner.
- Ökad Kontroll är inte alltid bra. Man kan bli nervös av att göra fel. Tycker generellt att det är bättre med ljud som man inte behöver styra.
- Viktigt att de som är utanför fokuserar på annat. Det gör inte lika mycket att man hör andra, men man vill inte att de ska höra.

Best Cubicle 2.0

Group 1

- Vill veta att WR:et städas med jämna mellanrum och att det sköts bra
- Vill inte veta hur många som har varit på toaletten
- Vill veta om det är fräscht och rent eller inte
- Byter bås/SWR om man ser att det är toalettpapper på golvet i ett eller om det är stökigt/ofräscht
- Papper på golvet drar ner upplevelsen av fräschhet i ett bås/SWR
- Hatar när det är kö och man går in i ett bås/SWR och det är äckligt där, för då kan man inte bara gå ut och byta för då tror de andra att det var jag som gjorde det så.
- Det kan bli en besvärande situation om man går ut från sitt bås/SWR **och det inte blir rekommenderat efterå**t
- Vill inte ha FÖR mycket information om varför något är bra/dåligt. Får man **veta varför det rekommenderas så får man andra förväntningar.** Typ att det är det mest hygieniska, då blir man besviken om det inte är tip-top. -> Ställer höga krav på underhåll.
- Bra att det blir jämnare fördelning av besöken
- Bra att kunna se snabbt vilka som är upptagna/lediga, kan vara svårt att se
- Bra för att det innebär fördelar med underhåll och städ -> renare WR
- Detta konceptet passar bra för alla kontexter där man passerar, alltså inte är betalande kund eftersom man då mest har fokus på hygien.
- Kan vara kundfördel även på WOW factor style eftersom man normalt sett inte behöver underhålla så ofta**. Best cubicle kan upptäcka avvikande situationer.**

Group 2

- Kan bli lite misstänksam om det står och blinkar "kom hit, använd detta båset", då tror man att något är **skumt, kanske kan göra det mer raffinerat.**
- Bra att toaletterna är fräscha! - Det är det viktigaste.
- Vill veta om det är kiss på ringen, bra koncept om det är unisex-toaletter för då är det oftare kiss på ringen
- Vissa WR:s har dörrar som står öppna när de är lediga och då ser man ju det redan
- Koncept som passar bra på stora toaletter
- Man kollar in i båsen om de står öppna ifall det ser fräscht ut innan man väljer ett, ifall många är lediga

Summary

- Viktigt vilken information som ges
- Utförandet viktigt för att man ska tycka om rekommendationen
- få väsentlig information men inte mer. Vill inte veta varför det rekommenderas eller hur många som varit där. Information kan få dig att anta saker.
- Ska inte behöva inte lägga extra tid för att interagera vilket inte behövs här. Går fort.
- Syftet är viktigt. Finns mycket fördelar med hygienen
- Bra att den kan upptäck avvikelser om något är smutsigt fastän det inte borde.
- Kunden: städ och underhåll, planering, undvika klagomål

Expo Cubicle

Group 1

- Tyckte om att båsen var helt isolerade, och gick från golv upp till taket. "Bås är det värsta som finns"
- Tyckte att konceptet var skojsigt.
- Viktigt att se hur rent det är
- Viktigt att kunna stänga av bilden, om man upplever det negativt
- Vikitgt att det som visas inte är skrämmande
- Passar in på ställen dit man har tagit sig av någon speciell anleldning, ex. Båtmässan, IKEA, SF
- Hade velat ha skog och fågelkvitter!
- **Problem att man sitter där inne för länge?**
- Måste se dörren tydligt
- Viktigt att man **kan orientera sig**, att det finns en horisont
- Moa: Ska det vara så ska det, visa i stor del av båset/SWR, annars lite tattigt
- Elin: kan vara på en del av båset, i ögonhöjd runtomkring, som ett akvarium
- Kanske ska bilden komma upp pö om pö så att man inte blir **skrämd/får en chock**
- Man **vill veta innan** att det kommer visas ngt där inne
- **Vill inte ge feedback i tvättrummet**

Group 2

- Det kan vara **roligt**
- Uppskattar när man kan vara ostörd på toaletten. Vill inte få saker upptryckt i ansiktet, bli störd
- Är något extra, men det är viktigast att det är rent och fräscht
- Kan **vara dålig belysning** om det ska funka, jag har svårt att se något om det är för mörkt (ex.vissa restauranger)

Summary

- Bra för användaren: upplevelse, privathet, ge feedback om vad man tycker.
- Måste kunna vara lugn och ro och man vill inte ha för mycket intryck samt ska kunna orientera sig och förstå hur allt hänger ihop.
- Kan var roligt med en överraskning och det passar bra på vissa ställen. Men den får inte chocka
- Problemet att det tar lång tid.
- Ska kunna stänga av om man inte gillar det.

Summering från Grupp 3

- Kul med ljud om det passar in och man kan göra en rolig grej av det.
- Vill ha **lugn och ro** på toaletten och inte en massa nya intryck.
- Men kan se ett syfte **med Expo på eventbaserade platser**. Inget man vill uppleva varje gång!!
- Om det lyckas ger privacy friend mest nytta.
- Best cubicle är användbart. Bra att kunna se vilka som är lediga längst in när det är högt tryck

Från handledning med Annie

Best Cubicle 2.0 är ett bra koncept som passar in med vad de gör just nu och kommer att göra i framtiden. Om vi skulle välja att gå vidare med det, hade det kunnat användas som detaljerat underlag för de. Samtidigt uppfyller koncepten de basala behoven (hygien) och inte mer därtill för användaren.

Expo Cube funkar som ett framtida koncept men det är inte troligt att SCA kommer att göra inredning och leverera hela bås. Detta koncept blir väldigt begränsat till de som bygger nytt och går inte att sälja till alla andra. Det kanske går att göra en simplare variant av Expo Cube? Bra upplevelse för användaren, lite mer oväntat och spännande koncept.

Privacy Friend 2.0 sa inte så mkt om detta konceptet. Vi hade redan avfärdat att detta koncept inte skulle upfylla sitt syfte med att få besökaren att känna sig mer privat.

Slutsatser för vidareutveckling

- Avgränsat oss till en lösning inuti båset och SWR
- Ska gå att sätta in i redan existerande bås & SWRs
- Fokus på en användarupplevelse utöver de basala behoven med en ren och fräsch toalett, - en wow-upplevelse
- Att öka den Privata upplevelsen
- Feedbackmöjlighet
- Möjlighet för kunden att informera besökaren

Notis: motstridiga behov: besökarens önskan om privathet kontra kundens önskemål om att informera och få feedback.

13. Evaluation of SoliQube - The impression

13. 1 Initial test survey

Survey

Height: _____ cm

Age: 25 or younger ☐ 25-40 ☐ 40-55 ☐ 55 or older ☐

Temporary state/mood Chose the options that best correspond to your mood at this moment, how you are feeling right now.	**Not at all**	**Not particularly**	**Quite**	**Very**
Happy/positive	☐	☐	☐	☐
Stressed/strained	☐	☐	☐	☐
Excited/alert	☐	☐	☐	☐
Relaxed/calm	☐	☐	☐	☐
Nervous/anxious	☐	☐	☐	☐
Low/negative	☐	☐	☐	☐

Washroom Attitude

*Public washroom = not a private person's washroom

What is your overall attitude to public washrooms*?
What makes you feel relaxed when using a public washroom?
Do you ever avoid using a public washroom although it is clean? - When/Why?

13.2 Script and procedure for INFO test

Test 3 Upplevelse av Information

Innan

Informera testperson:

Detta är ett anonymt test.

Det kommer gå till så att du får svara på en kort enkät till att börja med, därefter så kommer du få gå bort till en utmärkt toalett och efter det kommer du tillbaka till oss och svarar på ytterligare en kort enkät och några frågor.

Så vi börjar med enkäten…

[Person Fyller i enkät 1 INFO]

Nu ska du få gå ut till toaletterna här utanför där en är utmärkt med en lapp på dörren. Det sitter ingen kamera eller inspelare på toaletten, den är lika anonym som de andra toaletterna.

Antingen går du in och använder toaletten som vanligt, där du gör allt som du vanligtvis gör, det hade varit att föredra , eller så simulerar du ett toalettbesök så bra du kan.

Oavsett så vill vi att besöket ska efterlikna ett vanligt besök så bra det går, så även om du inte kommer att använda toaletten, - ta gärna toalettpapper, tvätta händerna och alla de bitarna.

Väl inne på toaletten kommer du också att hitta en liten låda med en öppning, om du rör handen över öppningen kommer det att komma ett maskeringsljud. Vi vill att du testar detta ljudet iaf två gånger när du sitter på toaletten/(eller står om man) .

Efter toabesöket kan du stänga dörren efter dig och komma tillbaka hit. OK?

[Person gör testet]

Efter test

Utan att saga något till oss först så ska du få kryssa I denna figur.

SAM

Informera testperson om SAM:

Du sätter kryss i cirklarna under gubbarna som du tycker stämmer bäst överens med den känslan du hade under besöket.

Den första raden är hur positiv/negativ känslan du hade, den andra raden hur upprymd eller lugn du kände dig och den sista raden hur dominant eller dominerad du kände dig.

Här vill vi att du elaborerar högt/ förklarar hur du tänker när du sätter dina kryss.

- **Fråga kring de tre dimensionerna**- Hur upplevde du toalettbesöket? - Varför?

[Person fyller I SAM och förklarar varför. Om hen inte pratar, fråga varför hen sätter som hen gör]

Nu ska du få fylla i ytterligare en skala...

Semantic differentiation scale

Informera testperson:

Du ska nu få kryssa i vad du fick för intryck av toaletten.

Det står 11 par av motsatta adjektiv, rutan närmast varje adjektiv är starkast.

Återigen vill vi att du tänker högt så att vi kan följa ditt resonemang.

Intervjufrågor INFO:

Om inte redan besvarat:

- Vad var ditt första intryck när du kom in I rummet?
    - Vad var det första du la märke till?
- La du märke till informationen inne på toaletten?
    - När under besöket läste du den?
- Vad tycker du om att det visades information inne på toaletten?
    - Innehållet eller att det visas överhuvudtaget?
- Vad tyckte du om bilden som visades?
    - Kändes den stor/liten?
    - Vad tyckte du om placeringen av bilden?
        - Insidan av dörren?
        - Hur upplevde du läshöjden?

- Vad tyckte du om att det spelades musik inne på toaletten?
    - Ser du några fördelar och nackdelar?
- Vad tyckte du om möjligheten att använda maskeringsljud?
    - Vad var bra/dåligt?
    - Hur kändes det?

- Vad tyckte du om doften där inne?
    - Var det trevligt/otrevligt? - Varför?
    - Hur brukar du reagera på dofter?

- Vad tyckte du om ljuset inne på toaletten?

- Gjorde du något annorlunda under ditt besök än vad du brukar?
    - Om ja, varför?

13. 2 Script and procedure for THEME test

Test 2 Upplevelse av Tema

Innan

Informera testperson:

Välkomna testpersonen

Som sagt så gör vi vårt exjobb här, vi har läst teknisk design på Chalmers. Vill testa olika principer som ska ingå i ett washroom koncept.

Det kommer gå till så att du får svara på en kort enkät till att börja med, därefter så kommer du få gå bort till en utmärkt toalett och efter det kommer du tillbaka till oss och svarar på ytterligare en kort enkät och några frågor.

Hela testet är anonymt, går det bra att vi spelar in vad som sägs här inne så att vi kan återvända till materialet i efterhand?

Så vi börjar med enkäten…

[Person Fyller i enkät 1 TEMA]

Nu ska du få gå ut till toaletterna här utanför där en är utmärkt med en lapp på dörren. Det sitter ingen kamera eller inspelare på toaletten, den är lika anonym som de andra toaletterna.

Antingen går du in och använder toaletten som vanligt, där du gör allt som du vanligtvis gör, det hade varit att föredra , eller så simulerar du ett toalettbesök så bra du kan.

Oavsett så vill vi att besöket ska efterlikna ett vanligt besök så bra det går, så även om du inte kommer att använda toaletten, - ta gärna toalettpapper, tvätta händerna och alla de bitarna.

Väl inne på toaletten kommer du också att hitta en liten låda med en öppning, om du rör handen över öppningen kommer det att komma ett maskeringsljud. Vi vill att du testar detta ljudet iaf två gånger när du sitter på toaletten/(eller står om man) .

Efter toabesöket kan du stänga dörren efter dig och komma tillbaka hit. OK?

[Person gör testet]

Efter test

Utan att saga något till oss först så ska du få kryssa I denna figur.

SAM

Informera testperson om SAM:

Du sätter kryss i cirklarna under gubbarna som du tycker stämmer bäst överens med den känslan du hade under besöket.

Den första raden är hur positiv/negativ känslan du hade, den andra raden hur upprymd eller lugn du kände dig och den sista raden hur dominant eller dominerad du kände dig.

Här vill vi att du elaborerar högt/ förklarar hur du tänker när du sätter dina kryss.

- **Fråga kring de tre dimensionerna**- Hur upplevde du toalettbesöket? - Varför?

[Person fyller I SAM och förklarar varför. Om hen inte pratar, fråga varför hen sätter som hen gör]

Nu ska du få fylla i ytterligare en skala...

Semantic Sale

Informera testperson:

Du ska nu få kryssa i vad du fick för intryck av toaletten.

Det står 11 par av motsatta adjektiv, rutan närmast varje adjektiv är starkast.

Återigen vill vi att du tänker högt så att vi kan följa ditt resonemang.

Intervjufrågor TEMA

If not already answered above, ask:

- Vad var ditt första intryck när du kom in I rummet?
    - Vad var det första du la märke till?
- Vad tyckte du om att film visades inne på toaletten? Bra/Dåligt
    - Vad tyckte du om placeringen av bilden?
- Vad tyckte du om ljudet?
    - För/nackdelar?
- Vad tyckte du om möjligheten att använda maskeringsljud?
    - Vad var bra/dåligt?
    - Hur kändes det?

- Vad tyckte du om ljuset?
    - Skulle du vilja kunna ställa in ljuset själv?
    - Skulle du vilja kunna öka ljusstyrkan?

- Vad tyckte du om doften där inne?
    - Var det trevligt/otrevligt? Varför?
    - Hur brukar du reagera på dofter?

- Gjorde du något annorlunda nu än vad du brukar?
    - Om ja, varför?
- Vad tyckte du om helheten?
    - Passade det bra ihop?
- Hade du velat ha möjligheten att stänga av temat?
    - Bara ljudet?
    - Bara bilden?
    - Båda?

- Vad hade du valt för tema om du fick välja?

13.3 Semantic differential scale

Semantic scale (expression/impression)

Rate the washroom on each of the following dimensions. For example:

Good  *Bad*

Isolated/protected  *Exposed*

Private  *Public*

Harmonious  *Inharmonious*

Secure  *Unsecure*

Premium  *Budget*

Unstimulating  *Stimulating*

Offensive  *Inoffensive*

Surprising  *Expected*

Hygienic  *Unhygienic*

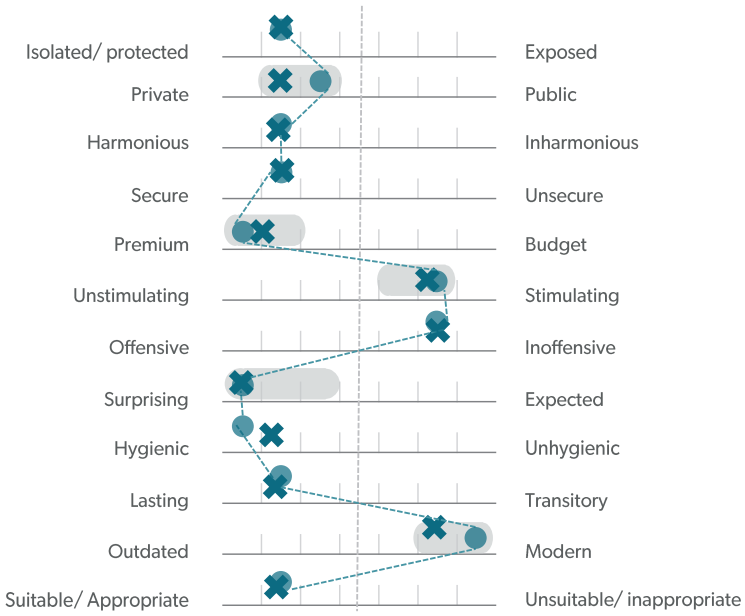
Lasting  *Transitory*

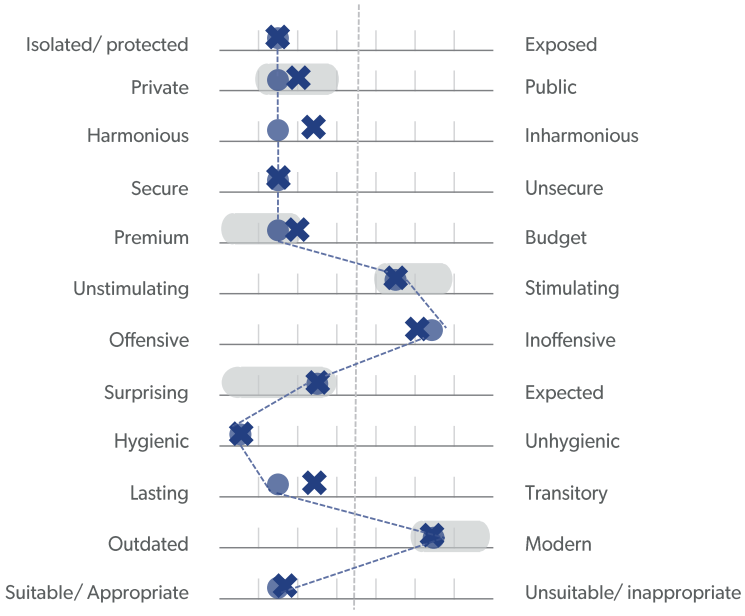
Outdated  *Modern*

Suitable/appropriate  *Unsuitable/inappropriate*

13.4 Semantic differential for INFO and THEME

Circle - mean value
Cross - median value





Isolated/protected - Exposed

INFO

Ten out of thirteen participants experienced the INFO washroom as isolated/protected, with a median value 2. In agreement with previous findings, a strong majority stated that the washroom's physical structure, the secluded room itself, was a reason to why it was experienced as isolated/protected where both the visual privacy and the sound-proofing was stated positive and decisive. The music's function as a sound barrier increased the isolated/protected experience according to three participants, where one person stated that the music made her feel like being in a bubble.

Of the three participants crossing a neutral impression, two stated that the room itself lead to an increased impression of being isolated/protected. For two of these participants the test situation made them feel exposed which one of them said affected the marking towards the *exposed* impression.

One participant experienced it difficult that there were technical gadgets in the washroom and meant that she felt sceptical and wondered about their purpose, which affected the mark towards the exposed affect.

THEME

The median for the THEME washroom was number 2 which indicated an isolated/protected impression by the participants. The argument was that being able to shut the door around you elicited the experience of being protected and isolated (but not trapped). Two persons felt that the sound and lighting enhanced the impression of being in an own world and consequently feeling isolated.

One response stood out from the others with a mark number five (maximum exposed) on the scale. That person believed that the sound created a feeling of exposure because s/he felt that someone from the outside could hear it. This feeling was shared by another participant, but s/he believed that the protected feeling inside the washroom from the ambient sound weighed up for it.

Private – Public

INFO

The washroom was experienced as predominantly private to different extents. Four participants graded private/public equally as isolated/exposed, and these alongside one additional person interpreted *private* as *being on one's own* and *public* as *being exposed*, rather than as a private-owned washroom at someone's home versus a public washroom, as the rest of the participants did. The motivations were then similar or the same for private/public and isolated/exposed; that you felt that you were by yourself in the washroom and that the sound contributed to a more private feeling.

" Yes I actually felt that even though I wasn't at home it felt as though it was for me when I was there"

" Private. But it is too perfect to be a private washroom"

One participant believed that the washroom felt like a public washroom and even more so because of the image with an advertising message. Another person thought that the washroom almost felt private:

"[…] it's not exactly like being at someone's home but you are more private (than at other public washrooms)"

One person thought that the scent was a contributing factor to why he/she experienced the washroom as quite private since he/she associated the scent to a private washroom.
THEME
The median was a number three on the scale. All answers were on the private side of the scale and there were no answers that stood out. Above all the participants thought that it felt more private than another public washroom would, even though they knew that it was public, the private experience was elicited with the THEME concept.
One person explained it as follows:
"At home you might have a more personal washroom and this felt more like that. Maybe like you were in somebody's home"

Harmonious – inharmonious
INFO
The average opinion of the washroom's harmonious/inharmonious impression was that it was slightly more harmonious than inharmonious with a mean value of 2,85 and a median of 2. If the participants experienced something as disturbing or disliked a part of the concept, like the type of music, the scent, if the volume was too high etcetera, this affected how harmonious/inharmonious the washroom was rated as. Some disturbance mostly resulted in the participants giving the washroom the second highest mark on the harmonious impression. If the specific disturbance however was more dominant it resulted in a more inharmonious impression between 3 and 5.
One participant thought that the loud projector fan together with the artificial audio flush was "too much", another would have wanted an image with a nature scene and believed that it would make the washroom even more harmonious.
THEME
The marks for the THEME execution was divided with six marks on number two and three marks on number 1, giving a mean value of 1,67. The THEME washroom was said to give a sense of peace and quiet, first and foremost through the sounds, but the impressions with all senses together contributed to this harmonious feeling.
" Harmonious, that goes without saying with the nature music and some peace and quiet in there, clearly"
" Very harmonious. When many senses are involved to give one impression which is predominantly positive. So, it feels just good"
Some details or aspects with the washroom was said to affect the persons' harmonious experience negatively. One said that the image was placed too high on the door, another was scared by all gadgets and new impressions.
"I was surprised and happy and worried at the same time"

Premium – Budget
INFO
All participants believed the washroom to have all necessities and lack nothing. Many aspects were taken into consideration when the participants rated how premium/budget the washroom was experienced as. All from the cleanliness, the secluded room itself, the Tork products (dispensers and paper products), the sound, scent and the image was said to give the impression of a premium washroom, where the Tork products and the cleanliness of

the washroom was mentioned most frequently. The test-execution of INFO, its content, was not mentioned to contribute to the premium expression.
The provisional execution of the projector mount in the ceiling and the masking sound on the wall with visible wires was mentioned by two participants to give a more budget feeling to the washroom and was considered when putting the mark (mark 6 & mark 3). One participant also explained that more subtle sound and scent would have resulted in a more premium impression.
THEME
The THEME washroom had an evident premium feeling with a median mark one. Words such as exclusive and luxurious were used regarding the birdsong and the stream. One person mentioned that the provisional execution of the concept was important but that it was something that s/he disregarded when marking, given that it was a test situation.

Unstimulating – Stimulating
INFO
Some of the respondents thought it was difficult to answer whether it was a stimulating washroom or not, one left no response and another commented that it was unlikely to be stimulated during simply a washroom visit. Again, if there was some aspect that the participant did not like with the concept, as for the scent or volume, this would turn out in the grading as an unstimulating remark. Many compared the washroom to a similar or identical washroom without the INFO concept, and stated that the concept washroom was more interesting, a new experience and that it gave many impressions. The music, the scent and the image was mentioned as stimulators and thus contributed to a stimulating experience. The median mark on the INFO washroom was number five.
THEME
Here too the participants had sometimes difficulties to understand the meaning of *stimulating.* Some interpreted it as invigorative while some solely interpreted it as stimulating for one's basic needs.
"Stimulating because you include many senses that get a positive impression. And you get your intellection going when you see things and hear things that you usually don't"
" (Stimulating) To sit and listen and philosophize"
One person did not think that the washroom stimulated him/her to relieve him/herself. This was however the case for one other participant who experienced that effect:
"That was a funny thing because I didn't want to wee but I did it anyway, I think it was the water sound"
The median mark was a number six.

Surprising – Expected

INFO

Five participants had not expected it to be music in the washroom, three persons mentioned surprise over that there was a projected image and three persons were surprised about the artificial scent. The responses spanned from expected, 7, to surprising 1, but was marked as a number 3 in average.

THEME

Seven out of nine persons experienced the THEME washroom as very surprising in a positive and non-frightening way, resulting in a median mark on number 1. One person marking number 2 on the scale said that he was already expecting something different because the washroom was part of a test which made him prepared for new impressions, the other equated number 1 with becoming chocked which is a stronger feeling than surprise, and hence marked a number 2.

Hygienic – Unhygienic

INFO

All participants thought the washroom was hygienic because they evaluated the looks of it and believed that it looked clean and fresh. One believed it was connected to the scent, that the scent contributed to the clean impression. The median mark was 1 and the average mark was 1,31.

THEME

Eight out of nine thought the THEME washroom was hygienic and marked the washroom a number one or two. One person thought that the nice smell contributed a lot to that feeling, and that the combined expressions resulted in an impression of a cleaner washroom than it possibly was. The person marking the experience as unhygienic (mark five) thought it was dingy needing to touch the sensor to the masking sound (which was a misunderstanding). The median was thus 1 and the average was 1,78.

Lasting – Transitory

INFO

There were split opinions whether the impression from the washroom would last or not. Eight persons believed so, but two were neutral and three participants believed that it would not last. One person however remarked that it would be lasting due to the test situation. The average mark was 3,23.

THEME

All participants marked that they will remember the washroom visit and that they believed it would make a lasting impression. Two of them said that it was something different and another because s/he got surprised. The average was 1,89 on the scale.

Outdated – Modern

INFO

All participants got the impression that the washroom was modern (median value 6), the reasons being that it was equipped with the latest Tork products and that technique such as the projection had been brought into the washroom.

THEME

Even though some of the participants had seen something similar before, they said that it felt modern because few washrooms look like the THEME washroom (median value 7). One person thought it would feel modern no matter the theme.

Appropriate/suitable – Inappropriate/unsuitable

INFO

The majority thought that the concept was suitable in the washroom and applicable to public washrooms in general, although some were more reserved and believed that the masking sound and the written message was questionable and that it depends on the context that the washroom would be in. The average mark was 2,31.

THEME

Generally, the participants were positive in varying extents. The nature theme was considered suitable and so was the ambient sound that disguises other sounds from the visit. Those who were less positive were either bothered by the masking sound or did not think that the concept was suitable in all washrooms, but those located at sites that one visits for pleasure.

13.5 Concept execution

Image/video size and placement

INFO

All participants had noticed the displayed image and the content. The placement of the image was experienced as a natural and self-evident choice and there were no suggestions of another placement.

" It was good, natural placement, you look for things to put an eye on"

(What did you think about the placement?) "I didn't think about it; it became very evident that it was there kind of"

Eleven out of thirteen participants noticed the projected image directly when entering the washroom and closing the door, and some noticed the distorted image already when opening the door. Only one participant read the information whilst sitting on the toilet, the rest read the information when standing up in front of the door from unknown distances.

(When during the visit did you read it?)

"Very instantaneously, I wonder if it wasn't before I even sat down on the toilet when I thought "what does it say on the door?" [...] So I saw it very early"

"Yes you see it because you lock the door and eh, work a little with the door. So yes, I think you could have it there, cause is it behind the toilet you can't see it at all"

The size of the image was good according to the majority of the participants. One person believed the size to be good for reading from the toilet but quite large for reading from a standing distance by the sink. Two participants noted that the information was readable without their glasses. Two participants who read the message while standing up (190cm, 182 cm) mentioned that the image was placed a bit too low. Another noted that the image was placed well if reading from a sitting position, but pointed out that men do not always sit down when using the toilet.

THEME

The women thought that the placement was good if you sat down on the toilet seat. However, one of them wanted to have the image further down since you sometimes bend forward over the knees. All men mentioned the problem with standing up and relieving themselves together with the image placement on the door. One believed it was legislative to have the image on the door since 75% (his estimation) of the users would see it. One person would like to have the projection on two places (also above the toilet) and another said that you would look around in the washroom anyways and that he would not like to have it in front of himself when urinating standing up.

"Most guys I think stand up in public washrooms which makes you unable to see the film, only when you walk in and out"

One person believed that even if he would sit down the first couple of times he would get lazy and start standing up again.

"Personally, I would avoid sitting on a public toilet. However, even if it was my home toilet I would probably be too lazy to sit down after a while. I would get used to it (the concept)"

Image content – INFO

The majority of the participants (eight out of thirteen) thought that the information that was shown in the INFO washroom was relevant and positive while the remaining five participants experienced that the information was not interesting or relevant to them.

The ones approving of the information had different explanations; that they liked information of general interest, that it made them leave their mobile phones that they otherwise usually

look at. That it is something to look at if you need to stay in the washroom for some time (which otherwise could become dull) and that it is a flexible and fun way to convey information and that it is received by the visitor.

”Nice. I’m one of those who often bring up my phone even if I’m only taking a wee. I still believe it’s a moment of quiet, especially now that we’re in this kind of large office, then it’s a private moment where I seize the opportunity to bring out the mobile phone. So, in this case I didn’t even think of my own phone but I thought it was nice that there was some piece of information on the wall and some music”

” […] are you sitting on the toilet and there is something on the door, then you look at it and read it, so it can be a way to focus”

One participant did not agree to this. He did not believe that a message on the would make a difference since you as a visitor either are focused on what you should accomplish in the washroom or on looking at your phone rather than reading the message. The same person said that he had scanned the image and concluded that it was not of interest, and that the message had not reached him since he had stopped reading.

The ones that did not experience the information as positive (five) experienced it either as something negative or they were neutral and said that it was “okay”, “it’s indifferent”, ”not relevant”, “not interesting” and that “advertisement or information do not belong (in washrooms)”. The latter participant equated the announcement in the image with advertisement which resulted in a negative response from that person. She stated that showing art or a picture could perhaps have been more appropriate. Another participant who liked the image also welcomed a pretty picture as an alternative to the informative image being shown.

The image was believed to fit well with the clean and bright washroom design and look, and two participants believed that it contributed to a pleasant feeling in the washroom:

” That it was white was the first impression, white and clean, a bit like clinical. But once you turned around it felt a bit cosier at once when you saw the projection”

Yes, it became like a decoration […] if not everything had been so white then perhaps it would have been cluttered and you would have thought it was chaotic and stressful, but here it was a bit like a painting or something like that”

A strong majority meant that the content matters for how the projected image is experienced and expressed that there is unwanted content. This was typically advertisement which for example was motivated by the fact that they did not want to be “fed with impressions” or sold anything. This would according to the participants not be appreciated and they would then have tried to ignore it or looked at their phones instead as an example. An oppressive or pushing message was also mentioned as unwanted.

No one experienced the image or the message itself as disturbing or offensive, and no one mentioned anything about the message containing edible and potable items, or that this would be impropriate in the washroom-environment. One participant argued that the image was inoffensive because it was a still that was shown and that extensive motion or sound would have been experienced as more intrusive and harder to ignore. Another person said that rolling images would have been distracting.

Video content – THEME

The film was perceived as restful and as it could help people to relax. Some participants mentioned that it was something to focus on and one believed it was a bit fun with the video.

"Especially in public washrooms you can feel tense, stressed and uncomfortable, and I think it (the THEME concept) is a good strategy to get rid of that"

One participant believed that the film together with the other stimulus made it possible to urinate, and that it was a still in motion was perceived as something positive since it elicited a calming impression.

"I think that was the reason to why I peed. All together combined was the stimulating factor. It was fine because it was such a settle movie. It was like a cinemograph; you know when only some parts are moving."

For one person, it felt as though he was near the stream in the film and not at the office. Everyone appreciated the nature theme that was used. Two persons thought that water is important to include. One person thought there could be a version of the washroom concept where you could choose the concept yourself.

Music - INFO

The music volume was constant and the songs that were playing during the visits varied from test to test but came from the same list. *That* music was playing was experienced as positive by all thirteen participants and contributing to a positive experience in the washroom.

The disadvantages that were mentioned with having music in the washroom were if you did not appreciate the type of music, if "annoying" music was playing or if the music was stressful or "pumping". One participant expressed that "radio music" probably would have been appreciated by most people and another said that melodic and harmonious music is suitable. No one graded the washroom visit more negatively on the SAM valence-scale because they did not like the music; the music was not experienced as disturbing or unpleasant enough to affect the overall washroom experience negatively. This, however the volume of the music did; it was said to affect whether the music contributed to a negative or positive experience. Four persons out of thirteen pointed out that the volume was higher than preferred and consequently affected the visit negatively.

The mentioned advantages with music in the washroom was that it masked other sounds naturally coming from the washroom since the music functions as a sound barrier, and that it contributed to a pleasant atmosphere. One participant thought that the music could be a little security for those who are afraid to be by themselves in the washroom, children specifically.

"There was some music and it was a bit welcoming I thought. Then you felt a bit taken care of, in a good way"

"The advantage is like in Japan and these where you shouldn't quite be heard, - what you do. It (the music) suppresses those sounds so that you don't have to put on the water tap so that it (natural sounds) won't be heard. Maybe also that it, a bit depending on the music type, feels more relaxing"

The music in the pop/funk genre was experienced differently by the participants, generally the music was experienced positively (*good*, *calm*, *nice* were words used to describe it) or as being *okay*, where sporadic persons wished for calmer music for a calmer atmosphere.

Ambient sound - THEME

That there was sound was experienced as positive and facilitative for relaxation in the washroom. The purging water sound was regarded good for the pee reflex both for adults and children. The bird song and the purging sound used was experienced as pleasant and suitable to the scene in the film, and it had a relaxing effect according to all participants. The sound was believed to make the visitor curious and pay attention to that instead of focusing on what might worry him/her, and thus unconsciously shift the focus.

"*That was a funny thing because I didn't want to wee but I did it anyway, I think it was the water sound"*

"Yes, it was a bit fun with this torrential sound I mean, because it could be something that makes you relax, cause if you hear purging water it might help if you have problems to pee" This thing with hearing music or tweet (is positive). Especially this purging, that is just great. And would it exist in a public washroom then I think you can suppress these (edgy) feelings and instead think "what is this?""

Two participants believed that the sound of the birds reminded them about "the birds in India" and "of walking in the woods", which made it a positive experience. Two others believed that the ambient nature sound elicited associations to sitting in an outhouse.

Masking Sound

INFO

Four participants thought that music as background noise is sufficient to cover up other sounds in the washroom, and one said that she would have preferred good sound-proofing than needing to deal with masking sounds. About half of the participants reckoned that the masking sound was completely unnecessary and lacking a purpose. One of these thought that it was unnecessary in single washrooms since there would not be anyone standing on the outside and listening to what people do anyways, and meant that it is unnecessary in cubicles since the smell would reveal what has been done in there regardless; and that the masking sound then would lose its point.

Five participants understood that others would like to be able to use masking sound in the washroom whereof one thought that it was a good idea. Another saw that there was a utility dependent on situation or where you are, but that the utility is greater in cubicles. He also mentioned that there could be persons that think of the fact that the masking sound resembles the actual flushing and that they would be uncomfortable with that. Further, one person expressed that artificial sound is better than flushing water or similar in reality to cover up sounds.

Two participants thought that the flush sound was too short to fulfil its purpose to mask and did not understand what the point was with the type of masking sound that was used, and one person experienced it as hard to time.

THEME

Half of the participants did not understand how the added masking sound should be used or for what purpose. Three participants expressed that they would not use such a function whilst six persons could see a benefit with having sound in the washroom to masks natural sounds from the visit. However, four of the participants expressed that the background sound that was used in the washroom or background music would be sufficient as a mask. For one of the participants the added masking sound went unnoticed because he/she could not separate it from the background sound.

"I didn't get this thing. I noticed no difference. I thought that something will come, but it didn't. (Would you have use for it?) Well if you are in a public washroom and know that you will do more than peeing then maybe it would be nice to have some sound or music that took it away. But there is no need for anything more…Only that purging water does a lot and distracts from much else".

Another participant who could tell the difference believed that the masking sound fit well with the theme. He had thought that the sound only was meant to be a fun experience to turn on but said that if the purpose was to mask, it was a good thing that the sound fit well with the theme so that it could not be distinguished as a masking sound.

Another person had the opposite experience and thought that the added masking sound did not go well with the background sounds. Beyond this she experienced that the volume of the masking sound was too loud which made her feel exposed in the washroom:

"The bird song was very good, but not this where you put your hand on it. I didn't think it matched the nature and the sound, so there was no harmony in it. It also sounded pretty loud so it made me feel quite exposed"

The masking sound was reckoned by one man to disturb the relaxed atmosphere and not go together with the rest of the washroom. Another opinion was that the masking sound used would amplify the sounds that the visitor would like to mask (sounds from doing number two) because the sounds are too alike.

Using masking sounds in cubicle-washrooms would be strange according to one participant since it would expose the visitor even more. However, he sees an advantage to be able to mask sounds from others as well, but with background music.

"So, it is definitely something people would like. But in public toilet … the sound would be weird in cubicles unless it is one sound for the whole room. It would help to not mask my own sound but others. you don't want to hear others. I don't think I would need strictly control over it. if it was there, it would be nice with some music...I'm not sure I had bothered to push a button"

INFO - Fruity scent – Cherry

The intensity of the fragrance was not controlled so that it was kept at an even level between the tests, it fluctuated in intensity as the fragrance cassette at some instances had to be removed from the washroom not to cause a too intense scent in the washroom. This variation contributed to the participants' varying experiences of the scent.

The scent affected the participants' experience of the visit extensively and the particular scent and the varying intensity was experienced differently by the participants. Three participants experienced the scent to be too strong whereof two believed it was very strong and that it consequently affected the whole washroom visit negatively.

" Yes, well it smells really intense I think. Not nice at all. […]But overall it was, no the smell was so dominating so that was like the thing that,"

Concerning the particular scent that was used it was more or less appreciated by the participants. One person did not notice the scent at all, five persons thought that the scent was alright, three persons disliked the scent and four persons liked it and thought that it smelled good. By those who disliked the scent the explanation was that it was experienced as synthetic or as perfume.

"I am sensitive to very many things so I think that fragrance is bothering if it is intensely perfumed. And the fragrance that existed in there, it wasn't that strong but I didn't think it smelled nice either, it was very like synthetic"

By those who liked the scent being used described it such as; “quite fresh”, “more a fruity than a hygienic scent”, “I really liked that scent”, “the cherry scent was nice”.
The participants generally appreciated the fact that there was an added scent in the washroom as long as it was not experienced as too intense or as distasteful.
” Well I liked to go in there, I like when it smells when you walk in, that the scent was planted there, it feels a bit fresh when you come in”
Two participants mentioned that it was positive because it masked other scents.
“[…] if it smells very intensely I think it is a little too much, otherwise it is positive because if you use a washroom that isn’t your own and you have to do “number two”, then it’s not that fun to know that you will leave a fragrance trace after you”
The person experiencing the scent as more fruity than hygienic believed that the scent contributed to the hygienic feeling since it reminded him more of a private than a public washroom, and that it consequently felt more hygienic. No participant mentioned anything about the scent reminding them of cherries or that it was experienced as awry in the washroom.

Nature scent – Pine

Seven out of nine noticed the added scent whereof all thought that it was pleasant. One person thought the fragrance was fantastic since it signalled that it just had been cleaned.
“Fantastic. You could tell that it was just cleaned. You don't know but you think that - thanks to the smell - it appeared as it was just cleaned”
The participants who noticed the fragrance believed that it fit well in the washroom and that it was well balanced in intensity and positively subtle. However, for the two who did not notice the scent it was evidently too subtle.
“Positive. Not so that it was...There are synthetic scents or perfume scents that aren’t nice cause it becomes too much, but it (the added scent) was good in the sense that it was just enough”
Two out of nine persons said that the fragrance contributed to the overall impression when marking the valence on the SAM-scale for the THEME washroom. Also, one person stated that the scent affected the first impression of the washroom positively.
“Very positive, both scent and visually and the whole atmosphere was relaxing”
“First I was surprised and then I thought it smelled nice. It was good. It usually doesn’t, but that was of course nice. Pretty good first impression”
The normal scent in washrooms was described by one participant to be associated with nuisance.
“I didn’t think about it (the added fragrance) because I automatically turn off my nose because I have such terrible shivers for public washrooms”
One person motivated the impression *inoffensive* with that it was “*a nice scent that wasn’t disturbing”*. The same person motivated the impression *hygienic* with the added scent; *“that there is a nice scent does a lot”.*

Lighting

INFO

Nine out of thirteen participants thought that the lighting was good. One believed it was too dim and two believed that it was bright or too bright. One thought it was beneficial when wanting to correct for example make up, while the other believed that there is no need for such bright light at public washrooms since you do not need to put on makeup or fix the hair like you do at home. The latter wondered if the washroom would have felt cosier if it would have been darker since the white walls added to the bright feeling of the washroom. One participant thought that the light was too cold and another pointed out that washrooms in an office buildings should be bright as they were.

THEME

Six persons thought that the lighting was pleasant out of which one thought it was fantastic. Two persons mentioned it as a problem when putting on makeup and not being able to see oneself in the mirror good enough and one thought the light was too blue.

" It was a bit blue-ish. It felt like in a lab or as some kind of bactericidal light. Not a warm light. Not directly unpleasant but different light,. Well, could maybe have been a bit better"

The light had the effect of wanting to go to sleep instead of going back to work on one of the participants. This person also stated that the light had a positive effect on the experience of the projected image.

"I went to relaxation mode. I felt I need to relax and go to sleep rather than go to work. But we need the light to enjoy the projector"

Overall it was perceived positive with the dimmed lighting as it created a calm atmosphere in the washroom.

Suitable business areas/ The context applicability

INFO

The INFO execution was considered suitable in most business areas even if it was deemed dependent on circumstances of the context. The music in the washroom was considered somewhat unusual at offices by one participant, and another believed that the INFO washroom was very suitable at the workplace.

THEME

One person expressed that it would have been "weird" with SoliQube - THEME in a context such as a hospital, but that it is suitable at entertainment and service businesses like in arenas or restaurants. Another participant agreed to this and believed that it would be "appropriate in hotels, lounges and spas but not so much for offices." The same participant was not sure about having the theme concept in open venues:

"In open venues people may take a bit longer so that it would prevent others"

One participants liked the theme concept that much that he would have wanted it at home and not only in public areas.

13.6 Emotional effect

Emotional effect

INFO

Positive/negative affect

Ten out of thirteen participants felt positively about the INFO washroom out of which eight entered a number two on the valence-scale. The contributing factors were mainly that music was playing, that scent was added, that the washroom was clean and fresh and equipped with all necessities. One of the participants stated that the experience in the INFO washroom was positive because it was as if she was “in her own little world”. About a third mentioned the projected image with information as a contributor to the positive experience.

“Well I liked to go in there, I like when it smells when you walk in, that the scent was planted there, it feels a bit fresh when you come in. The music was good but maybe other kind of music; it was not quite my favourite but I get the point with it. I also liked the projector”

One very positive participants expressed herself as follows:

“When I walked inside the washroom I was like “Oh, I like that there is music”, very pleasant, and also that there was music that I liked, […] and that it smelled nice, I really liked that scent. Then it was also a bit fun with this message on the door. This, that is already due, but it was nice nevertheless”

Another slightly less positive expressed himself as follows:

“Concerning the mood, it was quite positive, not to a fault positive but it was good, and about what I could expect out of a washroom visit, except these extra stuffs that you had, they were a bit surprising and good”

The same person said that the atmosphere made him take his time when washing and drying his hands and that he wasn’t in a hurry to get out.

The deviating responses that were neutral and negative marks depended on too intense scent and that one participant initially felt a bit startled by the sound of the projector, but that settled once the music came through.

"I was a bit startled at first, I thought it was annoying with a loud fan at the entrance".

The participants' first impression varied where different sensory stimuli was registered in varying order. Some participants mentioned that they got an early visual impression that the washroom was white and fresh, and two said that they became surprised or very surprised as a first impression when hearing the music, and seeing the light coming from the projector when opening the door.

"I was very surprised, you opened the door, because you heard nothing from the outside, that music was playing, and the light was already on, so it was like "oh!". But once the surprise had subsided it was mostly positive"

Calm/aroused

The majority of the participants, ten out of thirteen, stated that they felt calm or quite calm in the INFO washroom. This was found to have many explanations. Two participants declared that it was the first impression that made them fairly aroused. One thought that the sound from the projector fan was loud and startling before the music came through, and the other thought that there were so many new impressions at once, which created an initial anxiety and concern about what was going to happen in the washroom.

One person experienced the too intense scent and the too loud music to contribute to an arousal to some extent and some connected the feeling of calmness/arousal to the effect of the music, thus it was either experienced as calming that the music was present or it was

stated that the music had an arousing effect in a positive way. One person said that calmer music would have made her even more calm.
About half of the participants did not mention the INFO washroom to influence their calmness or arousal, and many of the participant stated that they felt as calm as they normally do.

Dominated /Dominating

The experienced dominance in the washroom varied much between the participants, from number 2 to number 5 on the scale. Of the ones feeling more dominated than dominant there were different explanations, for example that you could not control the music, the scent or the image that was being shown, that there was something in the washroom you did not comprehend, or that the washroom gave rise to an initial startled feeling.
The explanations for feeling more dominant than dominated were that you did not worry about anything/you did not have any concerns, that you felt in control and that there were no strange things in the washroom.
The median mark was 3,5.

THEME

Positive/negative

All participants had a positive experience in the THEME washroom. Five out of nine participants experienced it as number one on the valence-scale and the rest experienced it as number two. Two persons mentioned the combination of all senses involved, the scent, the visual stimuli and the sound as motivation for the positive experience. This congruence resulted in an overall relaxing atmosphere and a holistic experience according to four of the participants where one believed the washroom was experienced as cleaner because of it.
"Positive cause of all the sounds and lights and smell, it felt that it was cleaned seconds ago or it felt like that".
"Very positive both smell and visually, and the whole atmosphere was relaxing. It felt as though it was a good place to be compared to other washrooms that you just want to leave. So very positive I think"
Two participants said that the experience recalled of sitting in an outhouse:
"It was good. You got the impression that you were sitting on a pier on some kind of outhouse because of the water and the birdsong"
Two persons looked around more than usual in the washroom and another two somewhat lingered in the washroom because it was pleasant and "a bit like a spa experience". Another participant pointed out the risk of the visitors taking longer in the washroom due to the distractions, and meant that the enhanced user experience could result in this unwanted effect.
The reason for one of the participants to mark number two instead of number one on the valence scale was the suspicion against the new and unknown equipment in the room which caused an initial worry of being monitored.
Half of the participants said that their first impression was surprise, and for all of them this was followed by a positive impression due to different stimuli. The visual impression from the dimmed light was mentioned by the most people to give a first impression and the audial impression from the nature sound was mentioned the second most times. One out of six participants who had mentioned the dimmed light thought that it was negative, the rest

thought that it contributed to a positive calming experience out of which the majority also mentioned the birdsong in combination.
"It was dimmed,..and discretely shielded. You felt that "here you can be on your own"
"Surprised, amazed (the first impression). The blue light (was noticed first). It gives you the feeling of relaxing mode. And the voice of the birds gave me the feeling of walking in the woods"
"Surprised. But very harmonious. It was very calm and good"

Calm/aroused

Two persons marked themselves as number five on the calm/aroused-scale and they both mentioned that they felt affected by the atmosphere in the washroom. One of them had in the beginning of the test crossed that s/he did not feel quite calm to begin with.
Five persons marked number four on the calm/aroused-scale. They all became calmer than they normally get in washrooms especially by the sound and the image, out of which two said that their sentiment changed from the point that they entered. One person stated that he went from a three to a four and a half. One person expressed that she felt as calm in the washroom as she usually does.

Dominated/dominating

Four persons entered mark five, thus feeling completely dominating. These persons did not perceive the situation as problematic but saw it as something obvious to be in control of.
Three participants were neutral whereof one experienced that the control of the masking sound lead to an increased overall feeling of control. Nevertheless, this person stated that the feeling was tampered since she was in a new situation which affected the sense of having full control. Another of the three believed to have a mild feeling of dominance because if something would break he would need to fetch help or assistance.

14. Evaluation of SoliQube - The interaction

14.1 Script and procedure for interaction test

Test 3 - upplevelse av gester

Informera testperson:

Välkomna testpersonen

Som sagt så gör vi vårt exjobb här, vi har läst teknisk design på Chalmers. Vill testa olika principer som ska ingå i ett washroom koncept.

Innan vi berättar mer om testet ska du få fylla i en inledande kort enkät. Hela testet är anonymt, ***går det bra att vi spelar in/filmar så att vi kan återvända till materialet i efterhand?***

[Person Fyller i enkät 1 INTERAKTION]

Det vi ska testa är hur det upplevs att göra gester för att styra ett gränssnitt inne på toaletten, så vi vill alltså ta reda på hur det känns med geststyrning där inne. Ett syfte med gränssnittet är att man ska kunna ge feedback inne på toaletten, så detta testet kommer att handla om det.

Du kommer att ta plats på toastolen så kommer vi att guida dig genom hela testet. Efter testet kommer vi att ställa några avslutande frågor här inne.

Vi kan gå bort till toaletten.

Vi har använt två skärmar för att göra rummet mindre så du får se upp för fötter som sticker ut vid golvet, Dispensrarna fyller ingen funktion.

[Förflyttning till toaletten]

Du kommer att se en bild på ett väldigt avskalat gränssnitt på dörren, och vi kommer att stå bredvid dig under hela testet. Och som sagt det är inte ett test för att utvärdera dig på något sätt, det finns inget rätt eller fel, utan det som ska testas är vad för typ av gester som känns behagliga att göra, och om ledtrådarna är tillräckligt bra, ok?

Vi vill att du tänker högt hela tiden så att vi kan följa dit resonemng.

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1. **Tasks for gesture 1 – Fine motoric gestures:**

Vi tänker oss att du nu är på en offentlig toalett I ett varuhus och du har möjlighet att ge feedback på standarden på deras toaletter, och du känner att det skulle du vilja göra, du har inte brottom någonstans.

[Första sliden I 1. TEST handgester visas]

- *Om bilden ser ut såhär, hur skulle du vilja göra för att ge feedback?*

[TP visar och förklarar med ord och rörelser]

- **Om testpersonen inte vet** - > ta reda på varför och ge sedan instruktioner.
- **Om testpersonen "gör rätt"** - > Säg att det är helt rätt och förklara hur vi tänker oss för att förtydliga.

Förklaring: För att interagera med detta gränssnittet ska du försöka efterlikna den handgest som motsvarar det svar du vill ge på frågan eller det alternativ du vill välja. Det räcker att du håller upp en hand och visar denna gest för att ditt svar ska registreras.

Nu kan du få testa.

[TP ger feedback med gester]

Frågor

- Hur kändes det?
- Vad tyckte du om det här sättet att interagera? Varför?
- Mellan 1 och 5 – där 1 inte alls är bekvämt och 5 är väldigt bekvämt, hur upplevede du det att göra gesterna?
- Varför höll du handen I den position som du gjorde?

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2. Task for Gesture 2- Mouse click

Då går vi vidare till nästa sorts gest. Här gäller samma scenario; du är på en offentlig toalett och vill ge feedback på standarden. Det är fortfarande med hjälp av touch-free interaktion men kanske på ett annat sätt.

[Förstasliden I 2. Test Musklickvisas]

- *Om bilden ser ut såhär, hur skulle du vilja göra för att ge feedback?*

[TP visar och förklarar med ord och rörelser]

- **Om testpersonen inte vet** - > ta reda på varför och ge sedan instruktioner.
- **Om testpersonen "gör rätt"** - > Säg att det är helt rätt och förklara hur vi tänker oss för att förtydliga.

Förklaring: För att interagera med detta gränssnittet ska du röra handen över hela ytan, fast på avstånd som en muspekare. När markören ligger över ett objekt du vill välja eller klicka på så knyter du handen och öppnar den igen.

Nu kan du få testa.

[TP ger feedback med gester]

Frågor

- Hur kändes det?
- Vad tyckte du om det här sättet att interagera? Varför?
- Mellan 1 och 5 – där 1 inte alls är bekvämt och 5 är väldigt bekvämt, hur upplevede du det att göra gesterna?
-
- Vad tyckte du om att interagera genom att röra handen till olika positioner?
    - Var gillade du att ha handen? Högt mellan eller lågt?
    - Vad tyckte du var mest bekvämt?
- Kändes dina rörelser representativa mot skärmen?

3. Tasks for gesture 3 – Pushing and swiping:

Då går vi vidare till nästa sorts gest. Här gäller samma scenario; du är på en offentlig toalett och vill ge feedback på standarden. Det är fortfarande med hjälp av touch-free interaktion men kanske på ett annat sätt.

[Förstasliden I 3. TEST push and swipe visas]

- *Om bilden ser ut såhär, hur skulle du vilja göra för att ge feedback?*

[TP visar och förklarar med ord och rörelser]

- **Om testpersonen inte vet** - > ta reda på varför och ge sedan instruktioner.
- **Om testpersonen "gör rätt"** - > Säg att det är helt rätt och förklara hur vi tänker oss för att förtydliga.

Förklaring: För att interagera med detta gränssnittet ska du röra handen över hela ytan, fast på avstånd igen. Nu fungerar det så att du föser eller flyttar på föremål som är på bilden. Så du behöver alltså inte göra några specifika handgester utan bara förflytta objekt dit du vill. Upp ner åt vänster eller höger.

Nu kan du få testa.

[TP ger feedback med gester]

<u>Frågor</u>

- Hur kändes det?
- Vad tyckte du om det här sättet att interagera? Varför?
- Mellan 1 och 5 – där 1 inte alls är bekvämt och 5 är väldigt bekvämt, hur upplevede du det att göra gesterna?
-
- Vilken av rörelserna kändes bäst? Varför?
- Var det någonsin obekvämt?
- Vad tycker du om att göra stora rörelser?
- Kändes dina rörelser representativa mot skärmen?

Intervjudel

Nu är det dags för intervjufrågor. Här har du bilder på de tre olika gränssnitten som hjälp at titta på när vi pratar om de olika sätten.

Gester:

- Vilken variant tyckte du bäst om? - Varför?
- Vilken var lättast att förstå?
- Vilken var lättast att lära sig?
- Vad tyckte du om att använda stora rörelser som speglade positionen I bilden?
- Vad tyckte du om att använda små gester på en fix position?
- Vad tyckte du om den visuella informationen(feedbacken), alltså symboler, muspekare, animationer? (Använd bildstöd!)
    - Upplevde du att det gjorde interaktionen enklare?
    - Vad tyckte du bäst om?
    - Var vissa av de enklare att förstå?
- Vad tyckte du om att navigera med gester på en toalett?

Feedback:

- Vad tycker du om att ge feedback inne på en toalett?
    - SWR/bås?
- Skulle du ge feedback på en offentlig toalett? Varför/varför inte?
- Tror du att chansen att du skulle ge feedback på en toalett skulle öka om du kunde göra det med hjälp av gester? Typ som här?
- Tror du att chansen att du skulle ge feedback på en toalett skulle öka om du kunde göra det inne på toaletten?
- När under ett toalettbesök skulle du kunna tänka dig att ge feedback med gester?
- Finns det något annat sätt som du hade föredragit att svara på frågorna?