

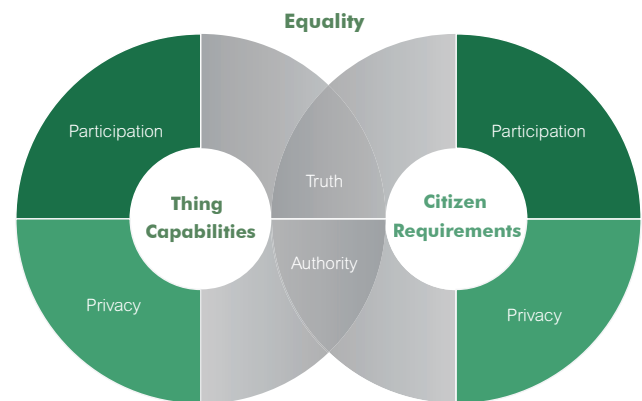
## 5. DESIGN QUALITIES FOR THINGS IN THE CITY

A synthesis is conducted to form a general conclusion from the results of the literature review and the empirical research. The synthesis leads to the goal of this master thesis: identifying qualities for Things with agency in the urban culture, to have Things perform appropriately during shared practices with citizens. The synthesis is conducted by analysing the meaning of the relevant tables of the democratic citizenship model, as described in chapter 4. These tables are put in the perspective of co-performance using the Thing Vocabulary in chapter 2 as a lens for this specific interpretation. A creative session about democratic design criteria for Things is conducted. The results serve as an inspiration for the synthesis (see Appendix 8.5 for the creative session and a complete overview of the results). The design qualities are based on the democratic tables that were identified during the practice based research as described in chapter 4. These are: Equality, Truth, Authority, Privacy and Participation. Each quality is described in a separate section, in which a coupling theme is identified for each theme. The first table, Equality, forms the main theme of the design qualities as this table matches with the vision of co-performance. Co-performance is the focus throughout this thesis as described in chapter 1.

### 5.1 EQUALITY – INTRODUCING THINGS AND CITIZENS AS PARTNERS

If Things with agency become part of the city, they will have an influence on city life and practices of citizens. It also means that they will perform in practices beside citizens. Therefore, it is stated in chapter 1 of this thesis that Things and citizens should be seen as equal collaborators for achieving human originated goals. However, it turns out that Things are more than collaborators. Concluding from the participatory sessions in chapter 4, citizens do have certain expectations of Things to adapt to the democratic values of the Dutch society. Things are not simply collaborators; citizens expect more from Things than simply collaborating in shared practices. Instead Things are seen as partners; actors that citizens can associate with, that can be understood and accepted as members of the city. Introducing Things as partners to citizens respects and acknowledges the democratic values of citizens. The vision of Things and citizens as partners means that the unique capabilities of human citizens and Things should be promoted by applying co-performance as a design framework, as stated in section 2.4.3. Hence, Equality is seen as the main theme of the design qualities and the remaining four

tables are interpreted from both the perspective of a citizen and a Thing; the requirements of a citizen and the capabilities of a Thing. Figure 5.1 shows the model for the design qualities based on the setup of the main theme.



▲ Figure 5.1: The setup of the design qualities model.

### 5.2 TRUTH – BRIDGING DIFFERENCES IN PERCEPTIONS AND INTENTIONS

Section 2.2 showed the differences between Things and humans: Things and humans have a different way of perceiving a certain situation and a different way of making decisions based upon their perception and inbuilt system. In other words, humans and Things may have different ideas and perceptions of the truth, and how to act in a right way according to that. It means that Things and citizens may become confused about each other's intentions. In study 4.3, participants showed their concerns about the 'wrong' interpretation by a Thing, as described in the discussion of section 4.3. Concluding, it is a requirement for Things and citizens as partners to bridge the differences in perceptions and intentions. The following design qualities are identified:

#### **Citizen requirement: Ability to understand decisions made by Things**

In study 4.2, participants expressed that they would like to know what drives a Thing's decisions. Hence, as a citizen it is crucial to first understand the perceptions and intentions of Things. A citizen should be able to create a mental map of the perceptions and intentions of Things to understand the decisions of Things. A mental map means a mental representation of what the Thing is sensing and what its intentions are. This mental map can be supported by the behavior and visual appearance of the Things. The Thing could for example show its sensitivities based on a sentence related behavior of a human, e.g. showing air pollution by a breathing motion.

### **Thing capability: Able to promote its sensitivities when there is interest**

As described in section 2.2, a Thing's sensors can lead to unique insights that are invisible to the eye of a human. Things can use these sensitivities to act in a way impossible to citizens; e.g. they can clean the air with catalysis as they can detect pollutants that are invisible to the sentience of a human being. Even though citizens do not have the ability of sensing these sensitivities, it does not mean that these should not be shared to them. It would stimulate the partnership: it can help citizens to understand Things and their perceptions, and it can enrich citizens' knowledge. However, direct insights should be in the background of the Thing's interface design and not upfront, as not everyone is interested in shared sensitivities. Citizens living in the city are strangers to each other and strangers do not show their thoughts openly or are interested in others to do so.

### **Thing capability: Able to show the lack of ethical sensitivities in critical situations**

As discussed in section 2.2, algorithms of Things do lack a lot of capabilities that the human brain has. Without consciousness and a morality, Things should never be put in situations where a capability of both is crucial. Yet, in a city context, with all its messiness and dynamics, it is almost inevitable that Things will become involved in ethical complicated situations. In the first place, it is important that a designer creates a system that avoids these situations as much as possible. Secondly, the behavior of Things should never seem as if Things are capable to act in an ethical or conscious way. A designer should therefore be cautious with implementing human-like features; a Thing should not look like a know-it-all but reveal its true nature and abilities.

## **5.3 AUTHORITY: ENTERING A CONTINUOUS AGREEMENT**

In order to act as partners, Things and citizens should aim to reach a certain goal collectively. A collaboration for a shared goal means that full control will not be with either a citizen or a Thing. A non-controllable autonomous Thing would presumably result in inappropriate behavior to citizens, as was clearly demonstrated in the storyboards created by participants in study 4.3. However, giving full control to citizens means a loss of agency by the Thing and means that citizens need to spend more time to reach certain goals. Instead, the creation of a balance is proposed to enable Things and citizens to share the control for decisions. They will give each other the right to act. Things and citizens will engage in an unspoken agreement whereby both receive a space

to agree or disagree. The agreement enables thus an open dialogue between both. The following design qualities are identified to create an open dialogue:

### **Citizen requirement: Provision of space for negotiability**

As stated before, citizens should have the space to agree or disagree with a Thing. If citizens doubt the decisions of Things, it should be possible for citizens to indicate their doubts either to the Things or to a human supervision team of the Things. A human supervision team is crucial for the acceptability of Things. The supervision team acts as a mediator between both. If a citizen reports a problem, the team should evaluate the capability of Things to negotiate and whether the Things were in their right in their reaction towards the citizen.

### **Thing capability: Able to react in different ways and to be partially directable in its actions**

Things should be aware that citizens play an important role in reaching a certain goal and should therefore reflect with citizens on whether they are still working towards the shared goal. Therefore, citizens should have a partial input on the decisions or actions of Things if these actions concern them; e.g. when a Thing is parked in front of the car and the citizen wants the Thing to stand somewhere else. After negotiability, it is important that Things have the capability to respond accordingly and adjust its actions if needed. Nonetheless, it should be stressed that citizens have a partial influence. Things have a unique contribution; therefore decisions by Things are negotiable and not always changeable. A supervisory team of humans is needed as a mediator in negotiations between Things and citizens in cases if a negotiation does not work out.

## **5.4 PRIVACY: APPRECIATING EACH OTHER'S ANONYMITY**

Participants of study 4.2 stated that they would not mind if Things would communicate with each other on the street without you as a citizen being able to notice it, as long as Things involve you as a citizen if the discussion also has an influence on you. As one participant stressed, it is the same with strangers in the city; one is not interested in the other one's activities as long as he or she is not, indirectly, involved. Participants of study 4.2 mentioned that their main purpose in the city is to get from A to B and that co-performance with Things would be a sub activity. It means that citizens should have the feeling that Things can be strangers; citizens should not have the feeling that they need to guard or intervene with Things. Things should be a familiar and foreseeable phenomenon in the city.

### **Citizen requirement: Involvement in the background because of profound trust**

As described before, trust means to a citizen that he or she feels that Things are capable to perform or exist in the city by themselves and that Things have no wrong intentions. As shown in the discussion of section 4.3, humans have a difficulty to trust the autonomous behavior of Things. Participants of this study would rather turn Things into servants that run tasks with no humans involved. In order for Things to be partners, citizens should be able to do their own activity without worrying about what Things are doing in the background.

### **Thing capability: Able to promote its self-reliance by showing its purpose**

In order for Things to be regarded as strangers being on their own, Things need to prove that they are capable of performing tasks autonomously. One way is to design constant behavioral patterns for Things, as individuals and as groups, in order for Things to become predictable and a familiar phenomenon in the city.

Another way is to clearly demonstrate the purpose of Things by showing their intentions. Showing purpose proves to citizens that the Things are in the city for a certain reason and are only acting to reach their purpose. Service workers in the city also wear a uniform to make their intentions understandable. Marenko & Allen (2016) state that the intention of a Thing is best communicated by the behavior and form design that is true to the nature of the Thing's capabilities. When a Thing's design reveals the function, the Thing's purpose becomes quickly understandable for bystanders. The design should preferably refer to the function in a symbolic way and use a symbol that is well known by humans. This way the intentions are quickly recognizable by citizens as it is shown in an intuitive way.

## **5.5 PARTICIPATION: CONTRIBUTING TO RELEVANT CITY ENCOUNTERS**

During the creative session of study 4.3, participants mentioned that it should be clear to citizens that the collaboration with Things improves the performance of practices in the city. Citizens need to be convinced about the added value of a Thing in order for Things to be accepted in the city environment. Things should be worth the investment: whether citizens are paying for the Thing by paying their taxes or whether citizens need to invest time. Moreover, Things should fit in the city and should not hinder citizens.

### **Citizen requirement: Engagement in collaboration based on intrinsic motivation**

Engaging citizens for co-performance should preferably be based on the intrinsic motivation of citizens. As citizens already have a goal in the city, they will only be interested in the co-performance with Things when it is valuable to them and their limited time. As citizens will not always co-perform with Things for this or other reasons, it is needed that Things sometimes initiate collaboration. A designer should be cautious when designing initiating Things. Citizens in a metropolis are strangers to each other; they treat each other in a different way than people would do in villages where everyone knows each other. Things should therefore not be too straightforward in their approach to citizens; Things should be reserved in their nature, especially if the citizen at the other side is not familiar with Things. Engaging citizens based on their intrinsic motivation means that Things are able to fit into the city appropriately to urban culture.

### **Thing capability: Able to proof its right to exist by showing its performance**

Things should prove to citizens that they have a right to exist. Things should be able to show their purpose and to indicate how well they are performing according to their purpose. Showing performance is important according to participants in multiple studies such as the design criteria session described in Appendix 8.5 and the contextmapping session in section 4.2. The design strategy to show the purpose of Things is already explained in previous paragraph. Showing performance can be done by adding variability to the design cues of the purpose. A design with variability can show the performance of Things in real time. For example, Things that clean the air can demonstrate that they are cleaning by making a breathing movement. Heavy or slow breathing communicates to citizens if it is working hard or if it is working slow and shows how clean the air is around.

## 6. THE DESIGN QUALITIES MODEL

The final result of the research of the thesis, the design qualities model, is presented in figure 6.1. This model serves as a framework for designing Things with agency in the everyday urban culture. The model is based on the concept Things as Citizens and introduces design qualities for co-performance between citizens and Things in the city. The design qualities model proposes a democratic dialogue between Things and citizens for co-performance in the urban environment. In other words: as partners that understand and act according to urban culture. The model is divided into two main circles that each represents the requirements of citizens and the capabilities of Things in order to create a democratic dialogue. Both requirements and capabilities are divided in four main themes based on four democratic values. The requirements and capabilities are summarised as follows.

### Citizen requirements

#### 1. Ability to understand decisions made by Things

Citizens should be able to understand decisions made by Things. An understanding should happen through the Thing behavior and capabilities. The Thing could for example show its sensitivities based on a sentience related behavior of a human.

#### 2. Provision of space for negotiability

Citizens can question a Things' decisions and negotiate with Things to change their decisions or behavior. A human supervisory team should be present as a mediator in the background, in order to create harmony in the dialogue between citizens and Things.

#### 3. Involvement in the background because of profound trust

Citizens require a Thing to work in the background, as citizens have an 'on the go' experience. It means that they need to trust that the Things are capable to perform or exist in the city by themselves and that Things have no wrong intentions.

#### 4. Engagement in collaboration based on intrinsic motivation

Citizens should be engaged to co-perform with Things based on citizens' own intrinsic motivation. As citizens already have a goal in the city, they will only be interested in the co-performance with Things when it is valuable to them and their limited time.

### Thing capabilities

#### 1a. Able to promote its sensitivities

Things are able to share their unique sensitivities, e.g. sensor readings, to citizens if citizens show an interest in it.

#### 1b. Able to show the lack of ethical sensitivities

Things are designed in a way that they avoid situations where decisions based on consciousness and morality are necessary. It is important that the design of the Thing and its behavior do not resemble human qualities as this could cause higher expectations than possible in certain situations or co-performance in general.

#### 2. Able to react in multiple ways and to be partially directable in its actions

Things can react in multiple ways towards citizens. They open up space for negotiation as they are partially directable in their actions. However, not every Thing decision can be altered by citizens, as they are equal partners to each other.

#### 3. Able to promote its self-reliance by showing its purpose

Citizens are strangers to each other. It is important that Things behave as strangers towards citizens as well. Things should prove their self-reliance, through predictable behavioral patterns or by clearly showing their intentions, in order to be accepted as strangers.

#### 4. Able to proof its right to exist by showing its performance

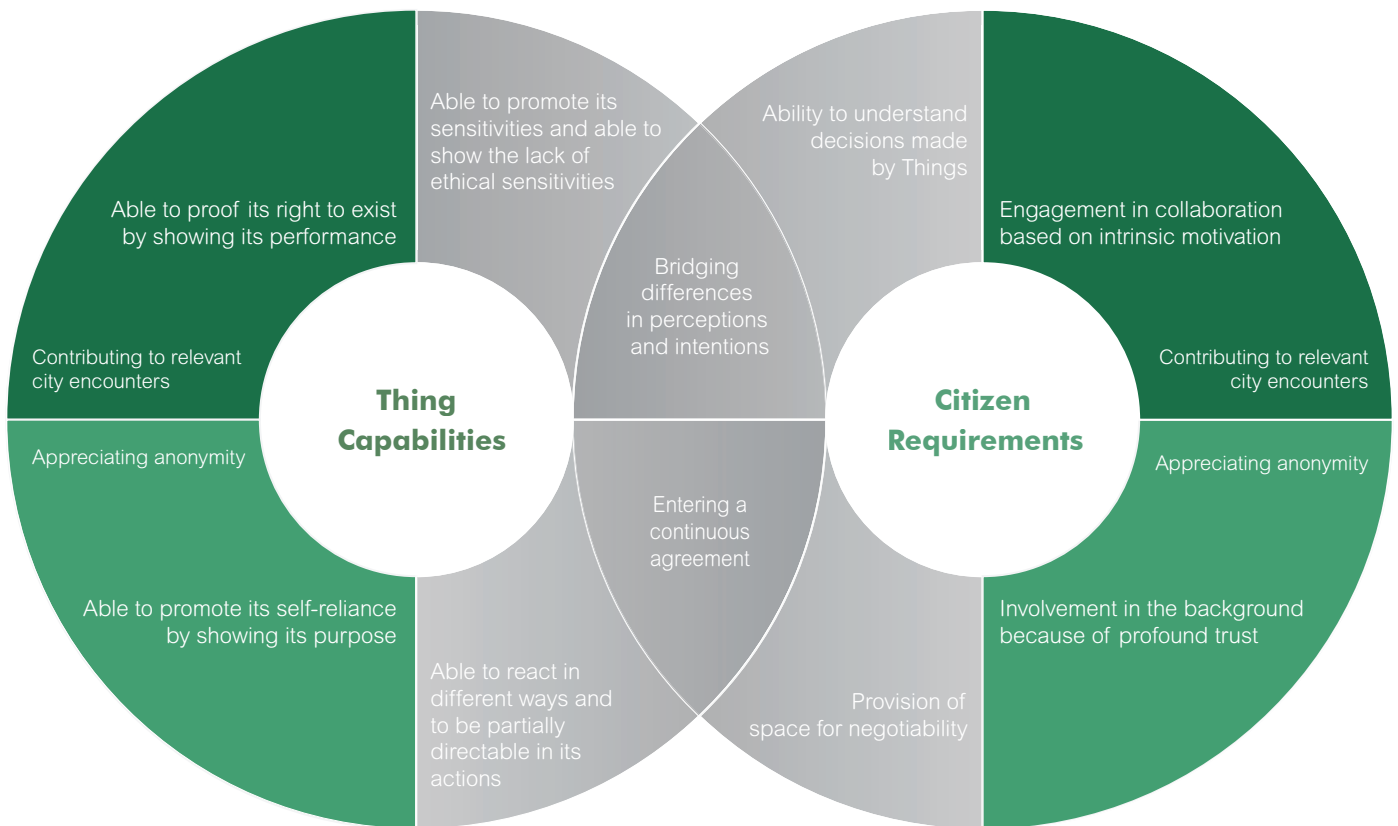
Things are capable to prove that they have a reason to exist and be part of urban culture in the city as they prove their contribution. Things are able to show their contribution by means of design cues that show the, valuable, performance related to the purpose of the Thing.

## 6.1 FURTHER RESEARCH

It is suggested to design a concept of three Things in the city according to the design qualities model in order to evaluate or validate the design qualities. The current result is based upon three studies about appropriate behavior values in public and a creative session with Industrial Design students, yet the design qualities are not applied to a design for practice. Creating a concept with the design qualities model enables to review each design quality and to refine them if needed. Moreover, the concept could serve as a demonstrator of Things as Citizens.

Therefore, a second part is added to the thesis whereby a concept is developed in the context of air purification using the design qualities model. The concept is evaluated in a user test to evaluate the design qualities. The concept is described in a second report.

## Things as Citizens



▲ Figure 6.1: The design qualities model.