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"DESIGNING AN ANALOGUE SERIOUS GAME TO SUPPORT SMART CITY PLANNERS TO REFLECT ON VALUE DYNAMICS IN THE URBAN SPHERE"

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December 1, 2021

UNIVERSITY OF TWENTE.

Faculty of Engineering Technology
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Human Technology Relations

Het Slimme Steden Spel

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Designing an analogue serious game to support smart city planners to reflect on value dynamics in the urban sphere.

Master thesis
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December 1, 2021

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In recent years there has been a rise in the number of cities that call themselves smart. A smart city is often a city in which technology is used to optimize urban processes. It is important that smart city planners reflect on and acknowledge the impact of technology on society beyond the function of the technology. This reflection and acknowledgement touches upon the ethical debate that is concerned with what people do and think. An influence on what people do and think are the values they have. For a smart city the values of the citizens that live in the city are important. Those values citizens have are not constant, but are dynamic and can change due to the impact of technology. Acknowledging this is an important step into reflecting on the long term impact of technologies that shape the futures of the city. This thesis proposes a game to aid in in this reflection.

The thesis elaborates on understanding how value change in smart cites occur and presents a board game that aims at supporing smart city planners to become aware of value change. This awareness helps to discuss the long term impacts of smart city initiatives at a societal level. The main goal of the game is to support smart city planners to reflect on value dynamics in the urban sphere. The design phase of the thesis builds upon a theoretical background of value change, smart cities and serious game design through an iterative design approach. This iterative design goes through several iterative steps in which a prototype is made, tested and evaluated. The final game uses interactive elements from games to engage players in a conversation about the connection between technology and value dynamics.

The results of testing the game indicate that there are two main challenges in incorporating value dynamics into a game: Showing that values change over the span of years or even decades and showing the complexity of value dynamics while keeping the game not too complicated for the players to play. The game makes players aware of the dynamism of values by making three different ways value change can occur in the smart city tangible. Those are; A change in the interpretation of the value, a change in the relative importance of values and the last, a change in the collective sum of values of the citizens due to change in citizen composition. Even though the game cannot show the complete complexity of value dynamics, it does make the players, smart city planners, more aware of the dynamism of values.

The results presented in this thesis are a proof of concept that introduces a novel approach of using a serious board game as a medium to engage in a discussion about value change. It can be used as an example of how people can get involved in ethical discussions in an engaging way.

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Everyone has values, but we cannot always describe what those values are to us. We can express our values based on abstract terms like safety and freedom. But what these values truly are is more complex than naming abstract terms. One way of describing values is what a person or a group of people consider to be important or good in life, or moreover, a thing that people should strive for in order to create a good life or society (van de Poel, 2018). Values are, probably because of their complexity, a common subject in research fields that are concerned with ethical questions. One of those fields is design. In product design, ethics plays an important role in reflecting what the impact of a product will be on its users and the environment. It has been researched in different ways and from different perspectives how such ethical questions can be taken into consideration in a design through specific design methods. Value sensitive Design (Friedman et al., 2017) is a method that considers ethical questions by specifically looking at values. It looks at how a product can be designed with the values of the users or designers in mind. But the complexity of values does not end with understanding what a value is, and how to design for and with values. In the Values that Matter design method (Smits et al., 2019) values are taken into account too, but are not considered to be static. Smits et al describe that the introduction of technologies affect values of its users and is able to induce a change in those values. In other value-centred design methods, values are considered to be long-lasting convictions that do not change.

However, long-lasting does not mean everlasting. The value a person has can change over time. Van de Poel (2018) shows that there are at least four different mechanisms that cause the value of a person to change: (1) Technologies lead to new types of consequences that require new evaluative dimensions and ,therefore, new values to evaluate sociotechnical systems. (2) Technologies offer new opportunities that lead to new moral obligations and ,therefore, new values. (3) Technologies create new moral choices and dilemmas where previously were no choices that require new values. (4) Technologies lead to new experiences that lead to new values or changes existing values. He also shows that this change can happen in five different ways: (1) Emergence of new values, (2) changes in what values are relevant for the design of a certain technology, (3) changes in the priority or relative importance of values, (4) Changes in how values are conceptualized (5) and changes in how values are specified. Some changes are small and occur more often, however the changes do not happen overnight. The change of values in people can take a long time. This is probably why most design methods view values as static. The lifetime of a product is often shorter than the time span in which change in values happen. However, there are also products with a longer lifetime, and smaller changes in values that can occur. This is why it is more relevant for some products to take value change into account, or to find out whether values changes should be taken into account of a product design.

But products and values are not two disconnected entities. In the Values that Matter design method, Smits et al. (2019) claim that technology is not neutral. People will judge technology based on their values and technology will affect their values. They can enhance the experience of certain values, and jeopardize those of other values. This dynamism of values that is connected to technologies is what makes designing for and with values so complex.

Value dynamics are present in our society through the technologies around us . However, it cannot always be seen. It is abstract and complex to understand. People that are concerned with the impact of technology on society, but have trouble identifying and anticipating those impacts, an benefit from understanding and becoming aware of these value dynamics. This thesis will try to make value dynamics more visible for those that work on smart city projects, and will attempt this by making value dynamics tangible instead of abstract.

A place in our society where we encounter new technologies that can impact our values is in the city. Many cities are actively embedding technology in their cities to optimize and improve urban processes. (Angelidou, 2015)These technologies are also called smart technologies. Those cities are therefore also referred to as smart cities. There has been a rise in smart city projects and the implementation of technology to improve urban processes (Mullagh et al., 2014). This rise has triggered an emphasis on the ethics of implementing such technologies in cities. And this emphasis has become more apparent to those making choices about the smart cities: the

governmental organizations (Jørgensen & Vrangbæk, 2011). Governmental agencies can use methods to help them taking ethics into account for their smart cities

Ethics is concerned with how humans act and how they live their lives. Technologies around those humans, and also the technologies present in cities, shape how the citizens act and how they live their lives in the cities. This is why technologies play an active and important role in ethics as Kudina and Verbeek also explain (2018). Within ethics of technologies, the implications of technologies are evaluated and anticipated for the future. But the values we have and we use to evaluate those technologies with, co-evolve with the technologies as mentioned by Kudina (2019). The dynamism of values that is affected by the technologies present in the city makes the ethics of technologies a far more complicated subject then they were before considering value dynamics. City planners that are concerned with the ethics of technology need to be made aware that how they evaluate technology is co-shaped by the technology itself.

Since there currently are methods for taking value change and value dynamism into account products such as Values that Matter, but there is a lack of methods available that takes value dynamism into account for the planning of smart city project, this thesis present a serious game to support city planners in becoming aware of value dynamics. This game will make value dynamics less abstract so the city planners can reflect on how value dynamics impact the ethical reflection of technology in the urban sphere.

The thesis statement that will be the foundation of this thesis will therefore be:

Designing an analogue serious game to support smart city planners to reflect on value dynamics in the urban sphere.

To further investigate this statement, three sub questions will aid the research process:
1) What is the impact of value dynamics on the development of a smart city?
2) What game elements and dynamics are most effective in making the value dynamics tangible?
3) What game elements will help a group of initiators of a smart city project to engage in a conversation about the impact of smart technologies on changing values and vice versa?

This report elaborates on the process of how this thesis statement and its sub questions are answered. First a theoretical framework is built about three specific subjects relevant for this thesis. Those are: smart cities, value change and serious games.

The smart city is the context in which value changes take place. Ethical reflection has been an increasing practice in municipalities and governing of a city. Municipal officials are confronted with policies stating that ethics should play a prominent role in their decision making. Jørgensen and Vrangbæk (2011) emphasize the importance of values within those ethics too. Municipal officials are placed in a position by the citizens to make those decisions about technologies for their municipality. How those decisions are made and on what basis this is done is the responsibility of the municipality and its employees. Most of their choices are being challenged by ethical questions and dilemmas that are specific for the urban space. This context will therefore be explored in literature. What it means to be a smart city and how smart technologies have a place in this context will be researched too.

The other subject, value dynamics, is part of the ethical side. What people think or do and the choices they make are often based on what they value in life. Value Sensitive Design (Friedman et al., 2017) focuses on how these values can be incorporated into the design of a product. Those values have been proven to not only be static, but can change (van de Poel, 2018). This dynamism of values is a complex subject that has been part of the ethical debate in literature. (Jørgensen & Vrangbæk, 2011). Apart from methods that focus on incorporating values into design such as the aforementioned Value Sensitive Design, here is also research done into take the dynamism of values into account for design such as Values that Matter (Smits et al., 2019) For this thesis it is important to understand the complexity of value dynamics and how they occur. Therefore, the literature written on this subject, especially in relation to designing with the knowledge of changing values, will be explored.

Lastly the subject of serious games will be explored too. A serious game is the tool that will be used convey the previously mentioned theories in an engaging way. In order to make this tool work, literature will be consulted on what defines a serious game. This thesis explores how a serious game can be deployed to work as a learning tool and what the benefits are of a serious game as opposed to traditional learning methods. The methods that are useful for designing such a game will be researched so they can be used to

shape the design phase of this thesis. The literature will be used to examine the use of physical components instead of digital ones and which of the components are useful for this particular thesis. One of the methods that proved to be useful is the theory of Triadic Game Design by Harteveld (2011)

Smart cities, value dynamics and serious games are not detached subjects. Although they are investigated individually at first, this thesis aims at bringing these three subjects together. Rather than combining these three subjects on my own, the insights of subject matter experts were consulted. What relationship these three subjects have is discussed from the perspective of experts that have in depth knowledge in their area of expertise. The role of these expert interviews therefore, is to help combine the literature found on the different subjects and to reflect on my own conclusions of how the different subjects relate to one another.

The framework built from this literature review and the expert interviews are used as a foundation for the design process. Beside these sources, a municipal official is interviewed as well. This official provides valuable inside information on how smart city initiatives arise in cities and how municipalities currently take values and value changes into account.

The foundation for the design phase is comprised of the literature research and expert interviews. The design phase consists of three stages. The first one is an explorative phase in which the results of the framework are used to explore the literature a bit more. This exploration is also shared with the subject matter experts to discuss how the three theoretic subjects can come together in a game design. The explorative design phase is followed by a design phase more focussed on concrete game design possibilities.

These are combined to create one game scenario which forms basis of an iterative design process. In these iterations the game is developed based on multiple cycles of prototyping, testing, evaluation and redesign. The final result of the iteration is the final game design that concludes the thesis statement. The overall results are discussed in the last chapter of this thesis which also contains the final recommendations.

Thus the thesis follows the structure seen in figure 1:
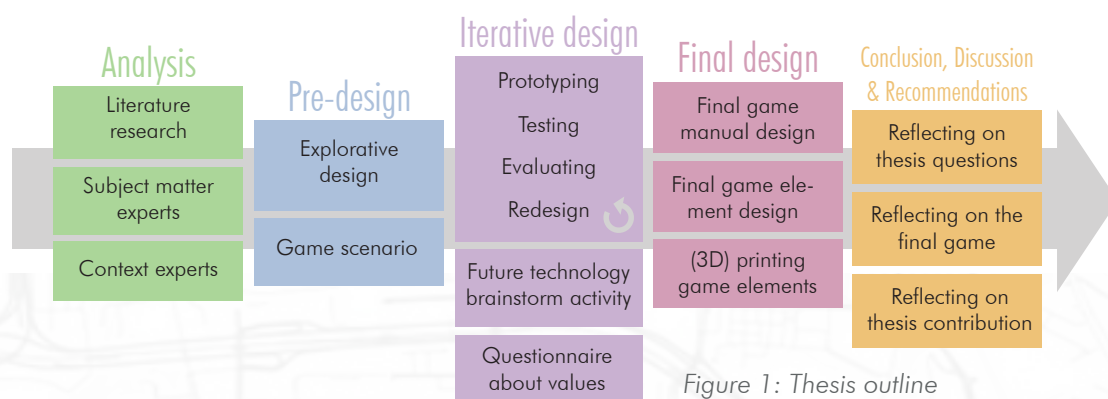
Figure 1: Thesis outline

This chapter builds the theoretical framework for the thesis based on three subjects: Smart cities, values, and serious games.

1.1 Designing for values dynamics in smart cities

Smart cities

Technology is changing the cities we live in. Though there is not a definite definition of what it means to be a 'smart city', the most important aspects are that a smart city is a city where new technology is embedded into the city and where the economy is more knowledge-based than labour-based (Angelidou, 2015). The rise in smart cities has become more evident according to Mullagh et al. (2014) . Most smart city initiatives are assuming that the technology they embed into these initiatives are universally beneficial to all citizens (Vanolo, 2016), but in practice smart technology has a different impact on each citizen and the urban environment they live in. The technology that is affected by urban environments and that itself affects urban environments can be referred to as urban technology according to the web page of the Journal of Urban Technology on the website of Scimago Institutions Rankings (*Journal of Urban Technology*, n.d.). Smart city technology, in addition, is urban technology that uses an information and communication technology to optimize processes. An example of this is the MotionApp described by Valdez et al. (2018). This technology makes use of sensors deployed across the city to create a real-time visualisation of transport flows in the city. Citizens can access this visualisation through an application on their mobile. The application facilitates spontaneous real time choices about transport that would fit their preference. This application addressed transport problems associated with the rapid growth of a city and was able to improve and optimize the transport through this MotionApp. When smart cities technology is mentioned in this report, it refers to such technologies.

How such technology will affect citizens in the urban environments will differ per citizen. One technology can improve the lives of citizens in one way, but simultaneously can be an obstacle to their, or others', lives in another way. This effect can be ascribed to the claim that technologies shape how we live and act in the world (Parens, 2014). By making choices about technologies, we are making choices on how we shape ourselves. How humans act and how they live is and how we can are make decisions about that is what ethics is all about. This is why technologies play an active and important role in ethics (Kudina & Verbeek, 2018). Governments organizations that are involved in developing a smart city have to consider that their citizens, who live and work in the city, each have their own view on matters concerning the city. If the government makes choices about technologies in the city, they do not only shape the city itself, but the citizens as well. This is the ethical debate that the government finds itself in. Are they able to make responsible choices if their decisions on technologies shape the lives of their citizens? This complex position of smart city planners urges them to engage in the ethical debate about technologies and his emphasis on ethics has become apparent to governmental organizations over the years (Jørgensen & Vrangbæk, 2011). How to make ethical choices in shaping the city is a question that is still being researched in literature. Jørgensen and Vrangbæk argue that one of the ethical fields the governments have to deal with is value change (2011).

Values

Every person in the previously mentioned smart city will have a different perspective on a smart technology and will perceive its impact differently as well. A difference in values is one way a difference in these perspectives and attitudes can be explained, since according to Kertzer et al., people's values can shape their attitudes towards cities' policies (2014). Values can be described as what a person or a group of people consider to be important or good in life, or moreover, a thing that people should strive for in order to create a good life or society (van de Poel, 2018). These values are based on what a person experiences in life. Values form the moral framework of humans and humans use this framework to evaluate and interact with the world around them. It also shapes how they design products. A product is, therefore, not neutral. It is designed by a human with values and those values are embedded in the products they design (Parens, 2014). Designing products cannot be done without consciously or unconsciously embedding values in the design. If a designer wants to do it consciously, but also ethically, they need to understand how this embedding of values work in products and how to take this into account in the design process . Fortunately, research has been done on how to take values in account in product design. The research branch of Value Sensitive Design (VSD) describes methods on how to do so (Friedman et al., 2017). However, this does not include the dynamism of values.

Value change

Values that matter

Kudina describes that the values we have and we use to evaluate products and technologies with co-evolve with those products (2019). This means that when designers take values into account and design products that embed values, the actual usage of the product can cause a shift in those values. The values are not constant entities, but they behave dynamically and can change over time. Since there is a great deal of research done on taking values into account without regarding the values to be dynamic, This raises the question whether it is important to take the changing of people's values in to account at all in design. The change of a person's value does not happen overnight. Since a value can be seen as a long lasting conviction it can be questioned whether this conviction can change over the course of a product's lifetime (van de Poel, 2018). For products that have a relatively short life, any change in values of its user might have a too subtle impact on the user's perspective towards the product to matter. As a result it would seem too much effort to focus on that change. However, there are also products that have a very long life. Value changes can

therefore occur over that lifetime. For those products it is relevant to consider this value dynamic in the design process.

A method that does take the dynamics of values into account is Values that Matter (VtM). It is a method that embodies and anticipates important values and investigates how technology impacts the way people act and think. (Smits et al., 2019) It looks at values as context-dependent resulting from user-technology interaction. An important theory that VtM builds upon is the mediation theory. It sees technology not just as an object but as a mediator mediating between the human and the world. Through the usage of a technology, the relationship an individual has with the world or perception they have of it can change. This can also be from human to human in which the relationship between two people can change due to the usage of technology. This shows that technology is not neutral and its effects need to be acknowledged, even if it is not visible to the user. M. Smits, describes it in a personal interview as "Technology is not neutral and you need to take into account what kind of effects that can have for the future "(translated from Dutch) (M. Smits, personal communication May 25,2021). Combining the mediation theory with designing for values VtM it allowed to anticipate value dynamics a technology can cause through investigating how the will act as a mediator.

What was also touched upon in the same interview with M. Smits, was that the context a user is in, influences the way the user sees a value, as affected by the technology, will depend on the context the user is in (M. Smits, personal communication, May 25,2021). If we look, for example, at the value of privacy, it can have a different meaning in a different context. To illustrate when a person is going to a swimming pool the value of privacy will have a more spatial meaning: they require to be left alone while they change into their swimwear, whereas privacy while shopping online for swimwear is more information-based: the customer can decide not to fill in certain information about themselves on an order form. In these two different contexts the value of privacy can be equally important, but have a completely different meaning. A technology can cause the change of a context, from the situation before the use of the technology, as a mediator, to a situation with the technology. In that case a technology will have changed the person's meaning of the value. This is why it is important to assign a clear definition of how people interpret a certain value. Understanding that the usage of a technology affects the user's perception of the world apart from just affecting the technology, helps to see that technology shapes the values of all people involved.

VtM uses this knowledge to build a method that helps designers to take into account the effects of

the technology on values and aids in creating a design that enhances the right values and prevents undesirable value changes due to the design's usage. The key in this method is to look at who is involved and what their values are before and after the introduction of a technology. This can be done through anticipation during the testing of a prototype and observing and interviewing the participants using these prototypes. This is what Smits et al. do in their research on VtM (2019) but as mentioned by M. Smits, in a personal interview "… you can also anticipate this partly by letting people think about it out loud and possibly also in the role of some else" (translated from Dutch) (M. Smits, personal communication May 25, 2021).

An important question to ask regarding values is whether the technology has a positive effect on the value, or a negative effect. A positive effect in this context means that the technology supports and enhances the execution of a person's value. A negative effect means that the technology threatens the execution. Insights into value change can be gathered through prototyping and user testing – by observing how people interact with the prototype, researchers can gather insights on the design and associated value change. It can give perspective on what will happen in the future if the technology or product is further implemented in society or a specific context. Evaluating and anticipating whether a technology has a positive or negative effect on the values can be done for smart cities as well as products. However, for a smart city a prototype test in not possible in the same way it is for products. A new smart city technology depends on the infrastructure of a city in order for its functions to work properly. Outside of its intended urban sphere, the functionality can simply not be tested, or the test would not give a realistic outcome. If the technology is implemented in the city it cannot be easily removed again. A test with a properly implemented technology raises ethical questions since it is embedded in the daily lives of citizens without their knowing or consent. If it were to be implemented to test, removing it with the purpose to redesign, change, and test again, will take a lot of work and not least of all be expensive. This is an extra challenge for designing for smart cities in comparison to designing for products.

Value change and products

Incorporating theory about value changes is relevant for products that have a long lifetime, meaning that enough time passes for change to occur. This change can be caused by external circumstances of a person's life, but Mesthene (2003) mentions that products themselves, and the introduction of new technology in those products, can impact the life of the users of those products. As was previously mentioned, Kudina describes that the values co-evolve with products and

technologies (2019). This in such a way that it can induce value change. So far, most of this information has been about value change in products. This raises the question how to translate this value change caused by products to the thesis subject. How do products and technology relate to the smart city context or urban sphere? If a smart city is considered to be a product, it can be argued that this 'product' will have a significant long lifetime. People will grow up in this city and grow old. Their new generation can continue to live on in this city. Enough time for value change to occur.

However, a smart city is not a single product, but it can be considered a conjunction of multiple products to serve an urban environment, meaning it is a system of products rather than a single product. And since value change impacts products and vice versa, a system of products can impact existing values people have (van de Poel, 2018 In that way, a smart city can also be described as a city with a digital infrastructure (I. van de Poel, personal communication, May 26, 2021). This infrastructure is a permanent asset that is always present in the city, but can be used in different ways. Different from regular products, a smart city cannot be changed easily. When having released a product that, after a while, becomes outdated, the design team can decide to apply a redesign. In this redesign process, new or changed values can be implemented and changing values can be taken into account. After some testing and finishing, this new version of the product can replace the old one. However, for an infrastructure implemented in a city this will not work. What has been implemented into a city cannot easily be changed, you can always add to the smart city but it is not so easy to remove or replace. A mayor difference therefore, between design for value change in products and designing for value change in smart cities, is that for smart cities, choices made in the past have consequences for the future. The choices will stand and cannot just be 'left out' in a redesign. Or as I. van de Poel said in a personal interview "With a product you can more or less completely redesign it (not always). But you cannot all of a sudden import a new system" (translated from Dutch)(I. van de Poel, personal communication, May 26, 2021).

Taking value change into account for the development of a smart city, an infrastructure that cannot be easily changed, is very relevant. How values change has a certain uncertainty to it. It is not exact science, predicting or even anticipating correctly how a value may change is not possible for all values. This is what makes designing for value changes within the smart city also quite challenging. This all explains why value change is relevant in the smart city, but what makes it important for city governments like municipalities to take this into account? Government agencies are more and more concerned with ethics in their decision-making. Especially smart cities are encouraged to

regard the ethics behind their choices in implementing smart city technology as important. They should be made aware that the technology is not neutral. Their argumentation for implementing the smart technology should not come from the technological advancements, but from ethics as well (Bianchini & Avila, 2014).

Value conflict

This non-neutrality of technology becomes visible when embedding smart city technologies into cities. A technology is often designed with a certain value in mind. Streetlights for example are often designed with the value of safety in mind. But focussing on this value can mean that another value is neglected. Moreover, it can mean that the value on which the focus lies conflicts with another value. For the streetlights, focussing on the value of safety can mean that it conflicts with the value of nature conservation. Streetlights will enable you to drive safely over a dark road, but it will cause light pollution of which nature and wildlife will not benefit. These value conflicts are embedded in technological systems (de Wildt et al., 2021) and will also be present in the smart city initiatives this thesis focusses on. When a municipality decides on how to implement a certain technology and multiple values are in conflict which each other through the implementation of that technology, the municipality will have to make a choice, and this choice will favour one value over the other. How to make this choice to prioritize one value over the other will depend on those that make the choices. Each person can have their own interpretation of what values are more important. A municipality can, therefore, make a choice based on the values they consider to be more important, while the citizens living in the city would have made another choice based on their value convictions. This shows that the implications of value conflict goes further than only the initiators of a smart city initiative, but that it also involves the citizens living in the place where the initiative is implemented. When citizens feel that their values are disfavoured they can take action against those initiators or against those governing the city (de Wildt et al., 2021). The influence that technologies have on enhancing one value and jeopardizing the realization of other values, shows that technology has an impact on values of people. The conflicts can be a mechanism that can cause value change to occur (Jørgensen & Vrangbæk, 2011)(de Wildt et al., 2021), but it is not a necessary condition.

Taxonomy and value change mechanism

The mechanisms that describe how technologies can induce value change can help in understanding value change better. People will react to a new experiences or problematic situations that can require their values to be questioned and re-evaluated. Beside value conflicts that de Wildt, Boijmans, Chappin and Herder (2021) talk about, there are others that have identified other value change mechanisms. Possible mechanisms for value change according to van de Poel (2018) are:

- Technologies lead to new types of consequences that require new evaluative dimensions and therefore new values to evaluate sociotechnical systems.

- Technologies offer new opportunities that lead to new moral obligations and therefore new values

- Technologies create new moral choices and dilemmas where previously were no choices that require new values

- Technologies lead to new experiences that lead to new values or changes existing values.

That is how technologies according to van de Poel (2018), and therefore also smart cities, can impact values and induce value change in the people that experience them. Knowing that it happens and how it happens is one thing, but since it was just concluded that it is relevant to take this into account for the development of a smart city, this raises the question: how can this be done?

If we leave the context of a smart city behind for a moment and go back to taking value change into account of value sensitive design, van de Poel also proposes a taxonomy (2018). This is a distinction between different kinds of value change than can occur. It consists of five ways in which a value can change ranging from the rise of completely new values to new interpretations of existing values. The taxonomy is listed as follows:

- Emergence of new values

- Changes in what values are relevant for the design of a certain technology

- Changes in the priority or relative importance of values

- Changes in how values are conceptualized

- Changes in how values are specified

If we apply this taxonomy to a smart city, a sixth change can be identified. This is changes in citizen value composition. In a personal interview I. van de Poel describes it as "With a city you also have a different way in which values can change and that is because new people come to live in the city. […] there is not much change in the values of the people themselves, but this is in what people with their values live in the city. The composition of the population changes."(translated from Dutch) (I. van de Poel, personal communication, May 26, 2021). What this means is that the values the city has is composed of all the different values of the citizens together. But which citizens live in the city is dynamic. When people move out of the city, their values move with them, and if

new citizens move to the city, their values move to the city too. It change can be most noticeable if there is a migration to the city that brings new cultures. This can also be a cause of value conflict if those cultures are very different. (I. van de Poel, personal communication, May 26, 2021). In this case, the change in values does not occur in specific people, but in the collective sum of values due to a change in population resulting in values changing for the (smart) city.

Following from this taxonomy, three technical features that help taking into account value change in product design are proposed by van de Poel (2018). These three, and their application for design, are: Adaptability (visualized in figure 2). A way to do this is to make the design modular so that a module that ceases to fit the value can be reconfigured or replaced. The second is Flexibility (visualized in figure 3). That is to provide the design with different possibilities to use the design in such a way that any of the actions does not change the design intent. The last one is Robustness (visualized in figure 4). Applying this to a design means that the design will be able to perform while respecting a variety of values, such that it can perform under different circumstances.

While these three features applied to a design will help dealing with value change, they all have their advantages and disadvantages. For a smart city this is the case too. Creating a modular design for a building in a city where parts that do not fit anymore can be removed would seem like a good investment. However, the following came to the attention while discussing these technical features with van de Poel in a personal interview: a city is also based on existing culture and buildings are part of that. If you would design a building that keeps changing because of the different modules the citizens tend to be less attached to such a building and prefer buildings that have a history and that will add to the culture of the city. At the same time, without intending to, a lot of buildings are quite flexible. Buildings that were originally factory buildings have been repurposed and rebuild as citizen residents or shopping halls. In that way, a city can be flexible in that exiting units can be used in different ways. However, a smart city is not flexible in all things. An electricity infrastructure or road plan cannot be changed easily (I. van de Poel, personal communication, May 26, 2021). Providing ways of how to handle designing for value change in smart cities is very interesting, but it might be beyond the scope of this project. The main purpose of the game is to raise awareness and discussion about values and changing values in itself.
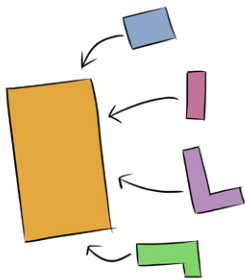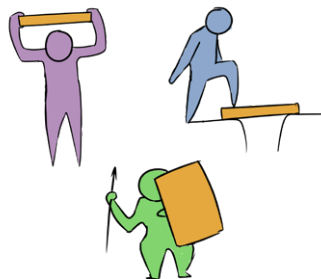

Figure 2: Adaptablity

Figure 3: Flexibility

Figure 4: Robustness

Application

Now that all this information regarding value change is gathered it is crucial go back to why it is important to understand values and how they change. The aim of this design research is to develop a serious game that will help a team of initiators who want to implement a smart city initiative into their city to use this knowledge about value change as a reflection tool for their implementation. Since values are ideas of what people consider to be important in life, they can be very abstract and not always be fully defined. What one person understands as "autonomy" can be perceived different by another person. Furthermore, this understanding of the value of autonomy can change within one person as can be seen in the taxonomy of value change (point 5: Changes in how values are specified). If a team of people implementing a smart city initiative would limit themselves to gathering data that contains the words of what the citizens concerning the initiative propose as values important to them (i.e. privacy, autonomy, safety ect.), this data would miss important personal interpretations. Instead, the team would have to interpret what those values mean in practice which could be not at all what the citizen first intended. To better help the team, they need to find a way to reflect on what values are, how they influence the city and what changes to the city influences the values of the citizens. What needs to be achieved is not to provide the teams with another way of gathering better data, but make them think about values and value change in a different way. This will hopefully stimulate the team to find their own ways in which they could best incorporate the newly acquired knowledge about values into their initiatives. This next step of applying new perspectives on how new technology influences values to practical design features is beyond the scope of this project. The focus of this project will be on stimulating discussion and reflection on the influence of smart city technology on the values of the citizens of the smart city.

To better tackle the application of the theory on values and value change on smart cities, two interviews with experts were held. The first one was with Merlijn Smits (M. Smits, personal communication, May 25, 2021). She has, among others, developed the Values that Matter design method and in her work she focusses on incorporating values and changing values in designing products for healthcare. To anticipate how technology changes what people think and do and how it affects their values, she observes and interviews people before and after the introduction of a new healthcare technology, while taking into account the importance of the different context of values. Since the VtM theory proved to be interesting for this project, but was not focused on smart cities, it was discussed in the interview how VtM could be applied to smart cities and what aspects are most important in the design of a smart city game.

The other expert interviewee was Ibo van de Poel (I. van de Poel, personal communication, May 25, 2021). He is the project leader of Designing for Changing Values and has proposed the value change taxonomy, the value change mechanisms, and a method for how a product can be designed to accommodate changing values. Similar to the work of Smits, van de Poel's work was not specifically written for smart cities. During the interview it was therefore discussed which of the taxonomy of values change were most important for smart cities. The difference between smart cities and products was also discussed and what that means for incorporating changing values into the design for a smart city. The subject of what elements are most important for a game that should stimulate discussion and reflection on the influence of smart city technology on the values of the citizens of the smart city was also discussed.

The conclusion of both of these interviews can be read in the following paragraphs and provided a good basis for narrowing down what information is essential for the project and what is excessive and distracts from the main focus.

What will aid this focus is making values less abstract to people working on smart city initiatives. A way to do this is to look at the effects of values on what people are doing and thinking. Asking questions to people about what a certain value will make them do or think is a way to get a better understanding of what a value means to a person. This understanding is very important since using abstract terms for values like autonomy, charity, privacy, can have a very different meaning to different people. Encouraging those different people to explain what such a value means and what kind of experiences they associate with that values is an important step to making values less abstract. It is not wrong to refer to the values as individual words for the purpose of the game, as long as it is clear that it is interpreted differently by different people.

If people are more aware of what a values means to them and what they think or do because of that value, it will help in the next step of how those values can change. This is an important part as it touches upon the subject of the influence of technology on the values. To get people to think about that influence for different people is to ask them what will happen to the value if a certain new technology is introduced. Reflective questions that can guide such a discussion are "what will happen to the experience of a certain value if 'this' is changed about the city?" or "what do you imagine the value to mean now that this change has occurred?" or "How is the experience of the value different from how it previously was?". To help reflect on whether these changed experiences are desirable or not, the effects on each value could be labelled as

negative or positive.

To keep the focus of this project clear and not too complicated it is important to filter between what is good and what is best to be included in the game. Value change is complex to understand and the value change taxonomy gives insights and breaks it down into different parts. But for the focus for the game to be on stimulating discussion and not on informing and teaching the players in depth about change, it might be wise not to include all the 6 ways of value change from the value change taxonomy. It will suffice to focus on only a few of the most important, and most occurring, ways of value change in a smart city. In discussion with van de Poel (I. van de Poel, personal communication, May 25, 2021) the conclusion was made that these include the following three:

- A change in the interpretation of the value. The value can start to mean something different to a person.

- And a change in the relative importance of values.

- The last one is a change in the collective sum of values of the citizens due to change in citizen composition.

Regarding the value change mechanisms, there are multiple ways how technology can change values. From the mechanisms van de Poel describes (2018), to what Jørgensen and Vrangbæk (2011) describe as mechanisms, to value conflicts that de Wildt et al. (2021) describe. Trying to teach the intended players of the game all these mechanisms is not the aim of the game. It would make the game overly complex and distract from the stimulation of discussion. This is why the decision was made to focus on the three ways values can change and make the players of the game understand and discuss those, rather than incorporating the mechanisms of value change.

Another way the focus of the project can be kept, is by limiting the people that are to be reached. The choice was made to focus on a team of people that want to implement a smart city initiative. However, the values and value changes they will be discussing are not only theirs, but should represent as much values of citizens as is feasible. To help this team of initiators think about how other citizens might experience and interpret different values, a roleplay system can be used where the team of initiators have to imagine being a citizen in the city. This is a great way to let them think about how each person experiences values, value change and technology differently. However, a risk can be that a person playing a role can be so strict in their roleplay that they forget that the character they are playing can change, which is a key aspect of value change. This can be prevented if the intention of the roles are clear, and if reflective questions emphasizing change are being asked.

These focus choices help in reducing the complexity and aid in making value change and the influence of technology therein more understandable for a team of a municipality making decisions about smart city initiatives. To make it more relatable and easier to work with, an explorative or playable approach is beneficial. In the case of this project, the chosen approach to do this is a game. Next part will explore the context of smart cities from the

Context

This past information was gathered using desk research and subject matter experts. To get more grip on the details of how smart cities are perceived by people from within the context, research was done to determine the context.

With this research to context, the viewpoint of municipalities themselves on smart city initiatives and their corresponding values were explored. What are their values for the city? How does a smart city team operate? How are the tasks distributed? Why do they want to be a smart city? All these are relevant questions in exploring the context. To get qualitative answers on these questions, specific cities were analysed. One of those cities was Amersfoort.

Context of the city of Amersfoort

Through an interview with the project manager smart city of Amersfoort (J. van Dijk, personal communication, February 17, 2021) information was gathered regarding what drives the city of Amersfoort to be involved in smart city projects, what projects they have done and how they work as a smart city team within the municipality. Each city will interpret being smart in their own way. For the municipality of Amersfoort, they see the transformation of their own city into a smart city as part of the digital transformation. Worldwide there are more opportunities to analyse large datasets. For a municipality this means that that they can organise their products and services in a different way. By investing in smart city projects the municipality of Amersfoort hopes to utilize the advantages of the digital transformation for the optimisation of their own internal processes and for their citizens and businesses. They do not want to invest in smart city projects from a technology push, but from a demand driven point of view. If a new technology can be linked to a demand from within the municipality or from the citizens and businesses of the city, they will consider investing in it. If this is the case, the department connected to the team of the smart city project will be involved. They will influence if, or how, the project can be utilized for the benefit of the city and its citizens and businesses. For example, when regarding a smart city project about measuring

the air quality, the department of environment will be contacted to see if there is a need for such project in the city of Amersfoort.

The city of Amersfoort has a team specifically for smart city related topics, but they also work together with other department staff if the topic applies to that department. The current smart city team of Amersfoort consists of the following people:

- A department manager that assigns the project to the team and who strategically investigates how innovative developments can be utilized for the municipality and the city;
- Two project leaders who do all sorts of projects and spent part of their time on smart city projects;
- Two department experts people. These are linking pins from their own departments to the smart city team. One of them is a landscape architect and the other is from the department of economy;
- A subsidy coordinator and finally
- a communication advisor.

An overview of the team can be seen in figure 5.
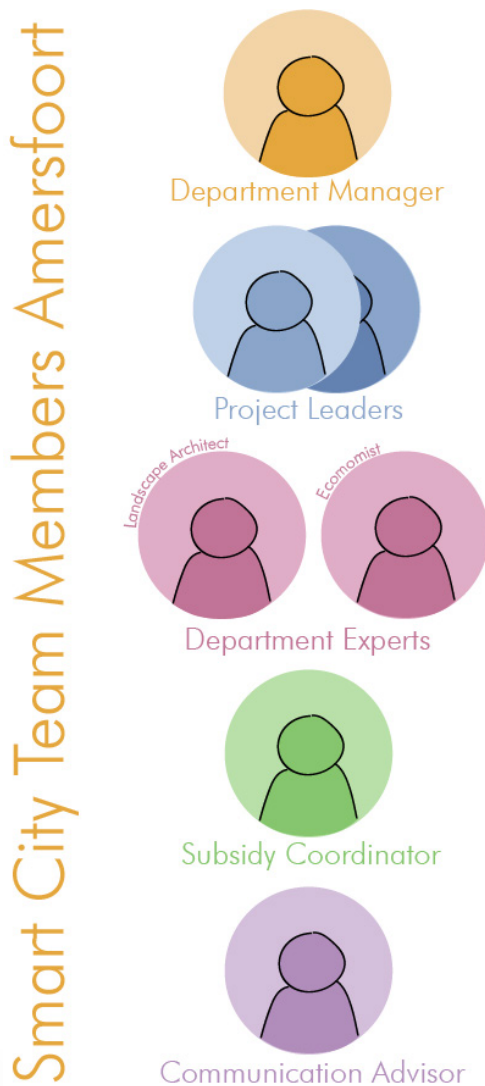
Figure 5: Smart city team

Smart city Emmen

Another city that is investing in becoming a smart city is the city of Emmen. In a policy vision document written in 2019 they explain why they want to invest in being a smart city and what their interpretation and focus is of one (Beleidsvisie Smart City Emmen, 2019). They conclude that the development of smart cities is happening on a global scale and is irreversible. This influences the society, and therefore also the society of Emmen. The new smart city technologies that are offered because of this development also offers opportunities for activities and employment within Emmen. If the opportunities offered by these technologies are utilized, this can mean preservation of local companies that are currently having difficulty competing with low-wage counties. Another advantage mentioned in the vision document of Emmen is that the new smart city technologies can be used to govern the city in a smarter way. This will result in more comfort for citizens and visitors of Emmen. An example for this is that the gap between citizens and government can become smaller with better participation opportunities. Citizens will be able through technology to give input about how they perceived the city is governed.

In short, there are two focusses regarding smart city initiatives for the city of Emmen. The first one is to stimulate local companies and the second is improving the interaction between citizens and the municipality. There are different ways, according to the document, that the city of Emmen wants to invest in these to focusses. First of all, they do not regard that smart applications in companies and organizations is the responsibility of the municipality, but they do recognize that the development of those have a big impact on employment of Emmen. Therefore, they will invest in these from their economic program. Secondly, to keep up with all the new smart city developments they want to invest in well educated people, especially in the area of ICT (Information and Communication Technology). Not only do they want to be able to supply educated people, but they want to keep those people involved with the city of Emmen. They want to spot talented students early on and connect them with local companies and the municipality to keep them involved.

What being a smart city for Emmen means is that they want to stimulate local companies and organizations to invest in smart technology. Furthermore, they want to invest in education and stimulate students to keep being involved and utilize the smart city technology to improve citizen participation with the municipality of Emmen.

The reason why cities like Amersfoort and Emmen will invest in certain smart city projects, and why not, will result from their views and opinions of what it means to be smart. But they are not usually the only ones involved.

Involved actors

Governments	Industry	Academics	Citizens	Other
Municipality	Entrepreneurs	Technology Profesionals	Residents	Organisations
Other Municipalities/cities	Local Businesses	TNO*	Visitors/tourists	Sociatal Organisations
Regional Water Authorities	Regional Businesses	Universities	Jong and Old	Healthcare Institutions
Provinces	Market Parties	Schools	Users of the City	Other Countries
Ministries	Employers	Education	City Panel	VNG**
Police	Start-Ups		Whizzkids	
	Companies that develop producs or services		Teachers	
	Companies like KPN		Tallented Students	

* the Netherlands Organisation for applied scientific research
**Association of Dutch Municipalities

Figure 6: Involved actors

Involved actors

A smart city project is seldom a project organized by only one company, municipality or other party. Usually these different actors work together. This means that the team who works on a smart city project is a complex, multidisciplinary team that needs to cooperate with different actors. To get a better understanding of what kind of actors have been involved so far, different smart city projects, mostly within the Netherlands, were analyzed on what actors have been involved in those projects. This analysis can be found in appendix A. The mentions of different actors from the examined projects were gathered and this can be seen in figure 6. To order these different actors, the quadruple helix (government, citizens, academics and companies) was used. This quadruple helix distinction is often used by researchers researching and developing methods to improve the cooperation between different actors involved in a smart city or other urban development (Roman et al., 2020). This exploration does not contain all the possible actors but gives insight in what sort of actors can get involved.

Formation of a smart city project

Thus, a smart city project is composed of different actors, but not all those actors get involved at the same time. An actor that starts one smart city project can get involved in another project when that project is already far into its development. When and how each actor gets involved will differ per project and per city.

To get a better grasp of how and when different actors could be involved the municipal official of the municipality of Amersfoort responsible for the smart city projects was contacted in order to explore how different projects came to be (J. van Dijk, personal communication, February 17, 2021).

Two projects, the Meet je stad and Snuffelfiets projects, are explained in the next section. These two examples are still simplifications and as the projects develop over time, more actors get involved. The aim of these examples is not to give a detailed analysis in actors' roles in smart city projects, but to illustrate that the process of developing a project is dynamic. A project does not start with the same actors as it ends and the role of an actor is not the same for each project they participate in.

Meet je stad

One of the projects that is happening in the city of Amersfoort is the so called "Meet je stad" project, which can be translated to measure you city. In this project, citizens can participate in workshops to make sensors that can measure the air quality, and place them in their own garden. All the sensors combined will give an overview of the air quality throughout the city of Amersfoort.

Though this is a project that is now supported by the municipality of Amersfoort, it was founded by an active citizen group that call themselves "de WAR". Citizens of Amersfoort can easily join in on activities that de WAR organizes. One of the people who joined in had connections to the RIVM (National Institute for Public Health and the Environment) and they got the RIVM involved in the Meet je stad project of de WAR. Later on de War itself contacted the municipality of Amersfoort for collaboration on the project. The municipality was able to reach more citizens about the project and acted as a way of communication from the citizens to de WAR. The municipality was also able to provide financial support so that they could invest in professionally calibrated sensors that de WAR was not able to invest in on their own. A visualized overview of which acter got involved when can be seen in figure 7.

Snuffelfiets

Another way of how a smart city project originates can be seen in figure 8. This is another project in which the municipality of Amersfoort participated called "Snuffelfiets" (which can be translated as sniffing bike). In this project, citizens got sensors attached to their bike so that in the areas they cycled in the air quality could be measured, creating a map of the city that displayed that collected data. In this case, it was the province of Utrecht that wanted to involve different municipalities of which Amersfoort was one that joined in. In Amersfoort there is a bicycle community called 033opefiets and the municipality of Amersfoort got them involved. In turn, this community was able to involve more citizens.
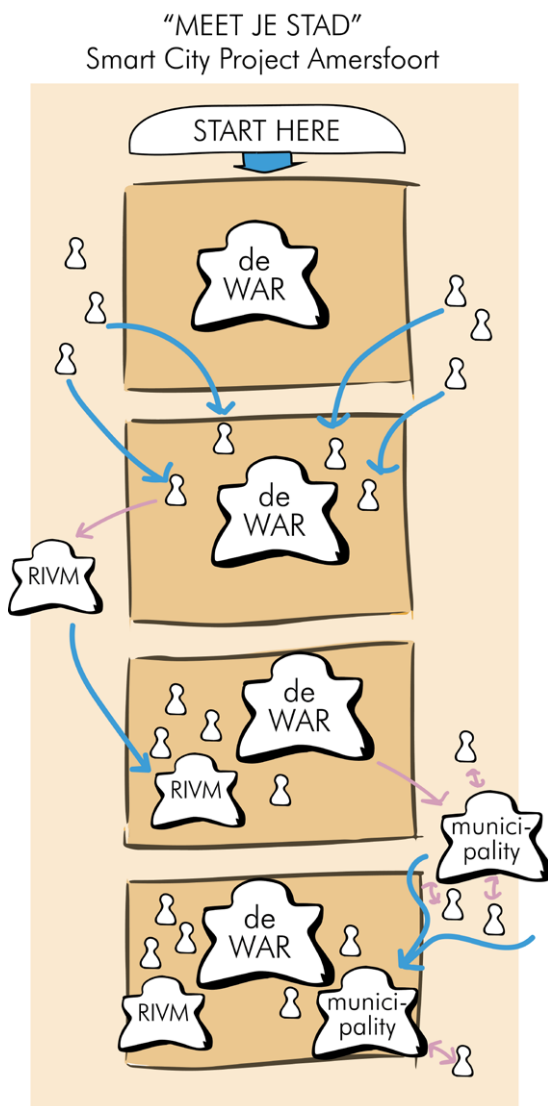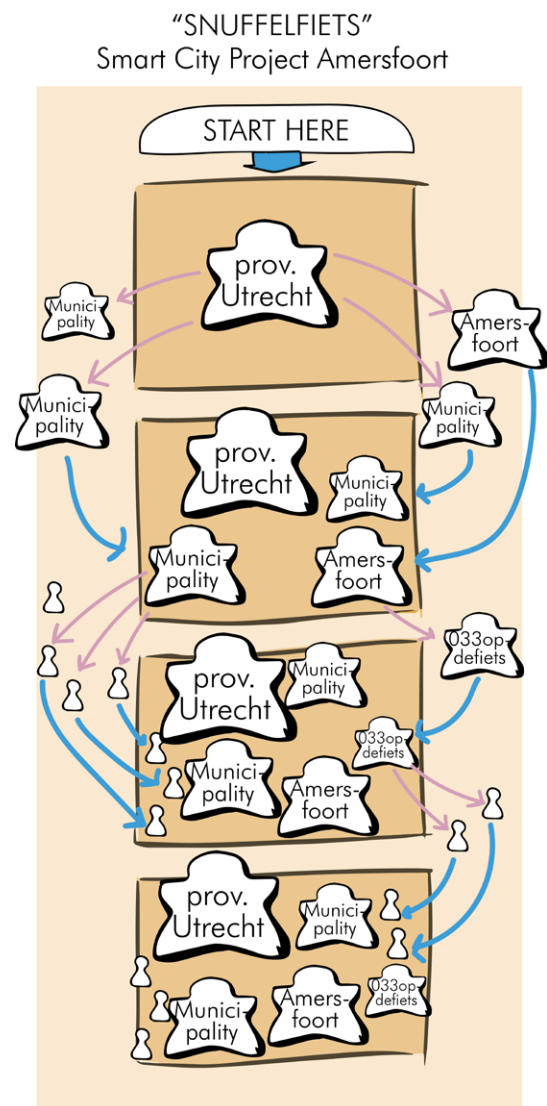

Figure 7: "Meet je stad" smart city project

Figure 8: "Snuffelfiets" smart city project

Serious games

Gamification is a term that has been used in research, but one that only a few academics have tried to define (Deterding et al., 2011) (Huotari & Hamari, 2017). In 2011 the definition of "the use of design elements characteristic for games in non-game context" was applied to the term gamification by Deterding, Dixon, Khaled and Nacke. Tools that use some elements of games, like playing cards, can therefore be described as being gamificated tools. A serious game, in contrast, is a game that was made with a purpose beyond entertainment. A serious game goes beyond applying game elements, rather it is wholly a game. It is therefore not the same as gamification, though it is a blurred line when a tool can be considered to have enough game elements for it to be a serious game rather than a gamificated tool. For both academic papers exist about their positive effect, related to theoretical perspectives that support the benefits of serious games for different fields (Deterding et al., 2011) (Blumberg et al., 2012) (Cavada & Rogers, 2020) (Hamari et al., 2014) though the precise impact of serious games is not clear. There are already several tools with gamification aspects developed in the field of designing for controversies in smart cities by Matos-Castaño & Geenen (2019). Because of that, the choice was made for this thesis to design a serious game for a more novel approach towards reflecting on value dynamics in smart cities. This thesis will also explore the usefulness of a serious game as a reflection tool in ethical discussion.

A serious game can help transport its players into a fictive situation and enact what they would do in such a situation. To understand value dynamics in the urban sphere, smart city planners can enact a fictive situation in which they can reflect on value dynamics without having to change the real world around them. Anticipating what kind of impact different values and possible value changes have on their responsible smart city futures in a fictive situation can help them reflect on the impact in real situations. The game should encourage them to reflect on the effects of value dynamics so they can use these reflection on real smart city projects instead of in a fictive situation.

For educational purposes studies show that the engagement of participants is higher when using a serious game as opposed to using traditional teaching methods (Blumberg et al., 2012). Participatory sense-making has been considered a valuable element in previous research on responsible smart city development too (Matos-Castaño & Geenen, 2019) (De Koning et al., 2018). Social interaction, face-to-face encounters of everyday life, and embodiment are important elements for participatory design according to De Jaegher and Di Paolo (2007). This all argues in favour of designing an analogue game for this thesis. Building upon the theory of embodied interaction, and specifically thinking with external representations as described by Kirsh (2010), an analogue game where the players need to interact face-to-face rather than a digital game will be made. This will include physical aspects of the game as representations that are physically manipulatable. A great deal of literature though, when talking about serious games, refer to and use examples of digital games. Publications about the difference between analogue serious games and digital serious games are hard to find. Because of this lack in literature on analogue serious games, most theories on this subject will be based on literature focused on digital serious games, while finding ways to use that knowledge for analogue games.

Embodied interaction

Choosing a non-digital tangible game as the output for this design research is partly based on the idea that having real objects you can touch, move and have something visible to discuss with others gives a different, and positive, experience. This as opposed to individuals looking at a 2D virtual space and interacting with it through a computer mouse. This idea is not just based on personal experience, but it is grounded in the theories of embodiment and embodied interaction.

These theories arose as a reaction to the belief that all humans have a split between their mind and their body (Svanæs, 2013). Thinking and cognition was considered separate from the physical world of the body. This split is called the cartesian split. The early computers were all designed with the cartesian split in mind, focusing on the cognitive only. Nowadays more and more theories have arisen that refute this idea (van Dijk & Hummels, 2017). The mind and the body are not as separate as was previously thought. In the field of embodiment the human is considered to be an embodied-being that is thinking, perceiving and acting with stuff in the world using both the cognitive and the physical.

One reason humans benefit from using the world around them to think with, is that it is easier for the human brain to do so. If the cognition of the human mind can lessen its load by using products in the world, it will and it will have an overall positive effect on the task (Sweller, 1988). An example of how the cognitive load can be lessened is by writing a phone number down on a piece of paper instead of memorizing it. Another example is the classical knot in a handkerchief to remind you that there is something you should not forget. Here, real objects can be used as stand ins

for mental objects. Another way humans can use the world to think with is by reorganizing the world so that the solution to a problem is more easily seen (Kirsh & Maglio, 1994). It takes far less cognitive load when solving a jigsaw puzzle to try and make a piece fit by picking it up, rotating it and trying it, than looking at the piece and mentally try to see if the piece fits. Sorting the pieces of the jigsaw by colour or corner pieces is another way of reorganizing and making it easier for the brain to process what the jigsaw consists of.

How embodied interaction differs from the experience of a real game versus a digital game can be seen in the believe that active touch is superior to passive touch (Klemmer et al., 2006). What this means is that actively touching a real object gives a better understanding of the identity and shape of that object than 'touching' a virtual object through a mouse. This sounds very straightforward, but take a look at the following example. When a player during a game of chess touches a real pawn in order to move it, the pawn's identity and shape are more easily detected than when a player clicks on virtual pawn in a chess game. No matter what chess piece the player will click on, it will all feel the same and only the visual input will tell them what they are clicking. In the case of a real, tactile, game of chess each peace and its identity can be felt too by touching.

An aspect of embodied interaction that is more socially focused are sharable and identifiable objects of thought (Kirsh, 2010). What is meant by this is that when people are working together a way to improve their understanding and help their thinking is to make use of an external representation. Instead of each individual having to mentally, or internally, picture a common issue, the issue can be externalized by making a representation that is visible to all. This externalization is not necessary in order to discuss the issue, but it lessens the cognitive load and makes thinking together significantly easier. For example, while brainstorming for a new idea concerning smart city lighting in Amersfoort, the brainstormers could externalize their objective by writing "smart city lighting in Amersfoort" on a white board for all to see. To go even further, when they are discussing where in Amersfoort this lighting could be placed, each member could internally picture the city map. They could communicate with each other about specific locations by mentioning street names and places. An easier way to communicate would be to include a paper map in this particular meeting so the members can point, or even mark, the places on the map. This way of turning the issue into an explicit and external object will help people improve their communication and thinking. A board game would be such an external representation. Therefore, for the serious board game of this thesis, it is important to consider what it is that needs to

represent. And what internal thinking concerning smart cities and values can be made easier to discuss by making it external.

Triadic Game Design

Designing an analogue serious game can best be done based on a method that has explored in what ways a serious game can best be designed. One approach to serious game design is the Triadic Game Design developed by Harteveld (2011). This approach argues that to make a good serious game you need to balance three so called 'worlds'. These worlds are: reality, meaning and play. The way to balance these three is to make sure that all three are equally present, but also that they are concurrently considered throughout the design. That means that in every step or phase of the design the focus should not be on only one world, but on all three at the same time.

The first mentioned world, the world of Reality, relates to the real world. The aspects of the real world are the aspects of games that players of the game recognize and to who they can relate. It differs per game how close it stays to reality, but each game has at least some connection to the real world. This connection is usually reflected in the fact that a game is connected to a specific domain. In the case of this project the domain is smart cities and value change. The world of reality can be incorporated in the design of the game with the aid of subject-matter experts. Such experts for this project are experts on value change, but also municipal officials that have teams specifically deployed for the implementation of smart city projects. Using their information and other information from the domain a model of reality, in in this case a model of value dynamics in smart cities, can be developed.

The second world is the world of meaning. It can be argued that no game is without meaning, but it makes a difference whether a specific meaning was intended by the makers or not. In the case of games with a non-entertainment purpose something beyond entertainment needs to be achieved. This something, so the triadic game approach claims, can be distinguished into three values: Knowledge, skills and attitudes. For this project the first and the last value are most applicable. The knowledge relates to a better understanding of value dynamics in the smart cities. And the attitudes relates to realising the importance of discussing value dynamics and the possible impact a new technology has on the lives of the citizens and their values for a smart city project.

The last, but not least, world is that of Play. This is what will make the game into a playful activity. In order to do that the game should be engaging, immersive and fun. Taking this world into account will result in a game concept. This describes in detail what the game is like, of what elements it exists and how they relate to each other. What elements the game will consist of   23

will depend on the genre of the game. In games, the genres are not defined by the type of content of the game, but by the type of challenges. A game can be more puzzle based or strategy based, and still be about the same topic.

Taking these three world into account will result in a well-balanced serious game according to Harteveld (2011). It will also result in a well-balanced smart city serious board game for this project. This means that the reality of a smart city and how values are affected by smart city projects should be to some extant present in the game. The meaningfulness of the game as a tool to help city planners reflect on their current knowledge and newly gained knowledge about value dynamics and how they could use these insights for their own smart city project, is another world that should be incorporated throughout the game design. Lastly, the elements that will make the game engaging, immersive and fun will help to give the world of play its place in the game's design. However, how to balance these three, how big their individual roles will be, is something that will become more clear as the game's design progresses and will be found through trial and error.

Three modes of learning

Concerning the world of meaning within a serious game, an important part is that something can be learned from it, or that new knowledge can be acquired. Learning is always a part of a game, whether it can be considered to be serious or not, since a player will have to learn the rules of the game. Moreover, they can learn what the best tactics are to win the game. However, for a serious game the aim of playing is not to learn to play the game, but to learn something beyond the scope of the game to be applied in the real world. This is a way of learning that is considered to be social learning. It can be described as "changes in understanding that goes beyond the individual to become situated within wider social units or communities or practice through social interactions between actors within a social network" (Reed et al., 2010,p 6) .

Social learning is still a very broad term. To narrow it down and make it more assessable for research Baird et al. (2014) created a topology that divides social learning into three, based on their nature. These three types of learning are: Cognitive learning; Normative learning; and Relational learning.

Cognitive learning

Cognitive learning is about gaining knowledge on a specific subject. This can be about gaining new knowledge through the restructuring of existing knowledge. Evaluating whether something has bought about cognitive learning is relatively easy to evaluate.

Normative learning

Normative learning is about bringing about change in norms and values. This can be about a personal change, but also about a group opinion or a common value.

Relational learning

The last of the three is relational learning. This is about building the relation between people, gaining understanding of the perspectives and mindsets of others and increasing the trust and cooperation between people.

For the project of developing the smart city board game the aim will be to help the smart city planners reflect on value dynamics and the impact of technology on those values in the urban sphere. The process of reflection can be seen as active learning which results in a changed conceptual perspective (Atkins & Murphy, 1993). Considering the three types of learning listed above the type of learning that will be applied to the game is normative learning mostly. Via the game, the smart city planners will undoubtedly encounter cognitive learning in the form of learning about value change. Relational learning will also be a part of the game, since it will be played with multiple members of a team of smart city planners, and therefore the players will learn more about the perspectives of the other smart city planners. But the focus learning point of the game will be normative learning.

Application

The final smart city game should support smart city planners to reflect on value dynamics in the urban sphere. They should be made aware that values are not constant and their change impacts the decisions made on smart city initiatives. The values they and citizens use to evaluate technologies are shaped by the technologies and they co-evolve with them (Kudina, 2019). This new insight, that is normatively learned, will be learned through the medium of a serious game. Learning this through the medium of games, rather than traditional mediums, will improve the engagement of its players. The real impact of a serious game is, however, not scientifically proven yet. What is proven is that making things more embodied, helps the human mind to make sense of the world. Embodiment for this game means that the game will have embodied elements. The objects in the game should serve a purpose. Having a central point to talk, aids in externalizing the subject of the conversation of participants and makes it more accessible for others to join in the conversation. Active touch helps to teach the players about the connection between values and technology. It helps them see that values are dynamic in a playful, embodied way. On the question how to

design such a game we can find answers in the theory of Triadic Game Design (Harteveld, 2011). The theory is developed for the design of games with a purpose beyond entrainment. Triadic game design does this by identifying three worlds that are relevant for the design of a serious game, namely reality, meaning and play. Taking these three world into account will result in a well-balanced serious game according to Harteveld (2011). It will also result in a well-balanced smart city game for this project. This means that the reality of a smart city and how values are actually affected by smart city projects should be to some extant present in the game. The world of meaning will be incorporated throughout the game design by helping smart city planners realise that the insights from the game can be used for their own smart city project. Lastly, the elements that will make the game engaging, immersive and fun will help to give the world of play its place in the game's design. This balance and how embodied interaction has a place in the normative leaning of value dynamics in the smart city is something that will be explored in the design phase of this project.

2
DESIGN

The chapter describes the game design process. It starts with explaining the design strategy and follows with a theory specific exploreation. It continues with the concept design and finally uses an iterative design process to get a final game design.

2.1 Design strategy

The framework and foundation is set for this smart city game. Now it is time for all the literature to be translated into a game concept. The design strategy for this project slightly differs from regular product design in which multiple concepts are designed, evaluated and one chosen to fully design. As Harteveld mentions in his book on triadic game design (2011), most game designs are based on an iterative process during which the game is tested often. The design strategy for this thesis is also based on this iterative process. It will follow the process of game prototyping, test, evaluation and redesign. The evaluation will be done by looking at different aspects of the game that are important to that specific iteration, the game in general, and the thesis questions summarized in categories. Each of those categories will be evaluated on the three worlds mentioned in triadic game design. Embedding the three worlds of triadic game design in the evaluation of the iterations should aid in designing a balanced game.

An explorative design process however, precedes this iterative process. This will give a more gradual transition from the analysis to a concept that can follow the iterative process. This explorative process will start with some theory specific exploration. This exploration was also used in conversation with matter experts on that theory. The outcome of these explorations is used for the concept design process, which eventually leads to a concept that will go through several iterative cycles.

This theory specific exploration was done to get a better grasp of how literature and game elements can be combined. The explorative sketches generated the first ideas and helped in understanding the literature better.

Value taxonomy & value change mechanisms

What needed to be explored first was the literature of value change taxonomy and the value change mechanism as described by van de Poel (2018). Two sketches were made to explore this literature. The first sketch, seen in figure 9, only focusses on value change mechanisms. This specifically explores how the four value change mechanisms could be visualized in a smart city context. For example, if a bike sharing system were to be introduced in a city this will lead to new opportunities. Instead of taking a bus when you visit a city, a visitor now had the opportunity to choose a bike that gives them more opportunities to stop the options available for stopping is not linked to bus stop locations anymore. But, this will also lead to new obligations. For example, it is the visitor's own responsibility to return the bike. A value change in the visitor's sense of duty to return the bike safely, to be a citizen to who such a bike can be entrusted, could occur. The exploration shows what the mechanism would look like in a smart city context, but not yet how it can be used in a game environment.
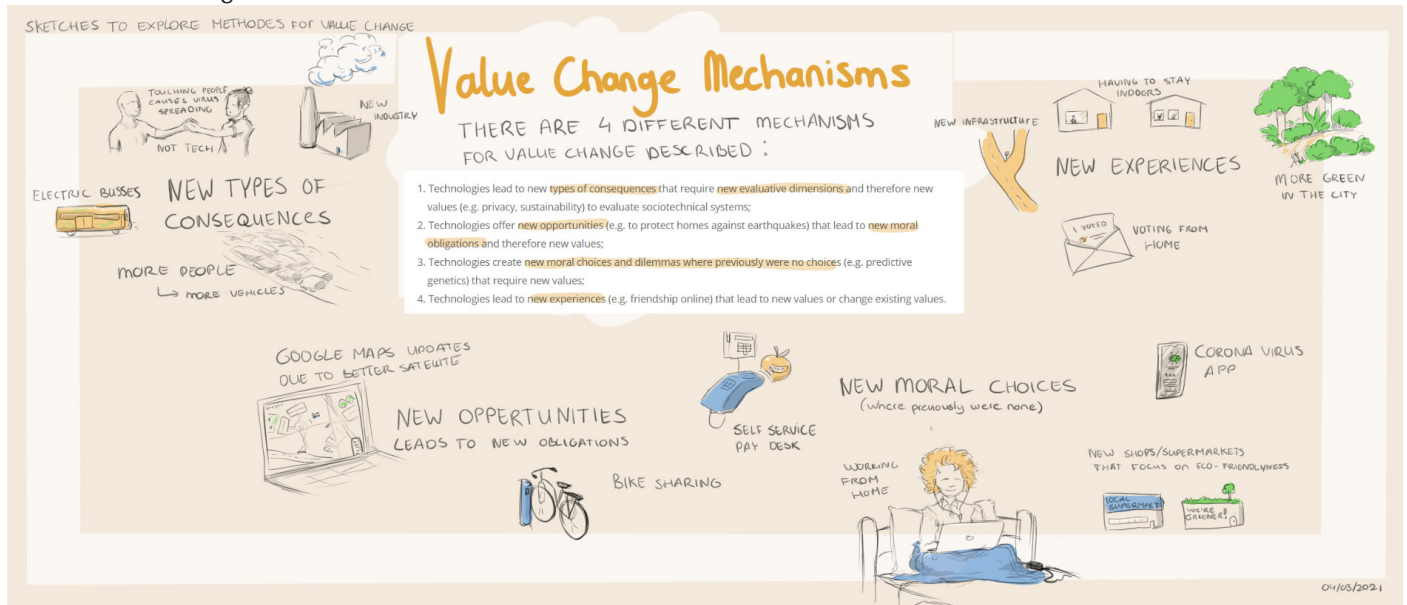
Figure 9: Value change mechanisms exploration

The second exploration, seen in figure 10, focuses on how value change could be triggered in the game due to events that reflect the change mechanisms. This could be done by a described event that corresponds to a specific mechanism. The players would have to react to that event by redefining the meaning of values in the game.
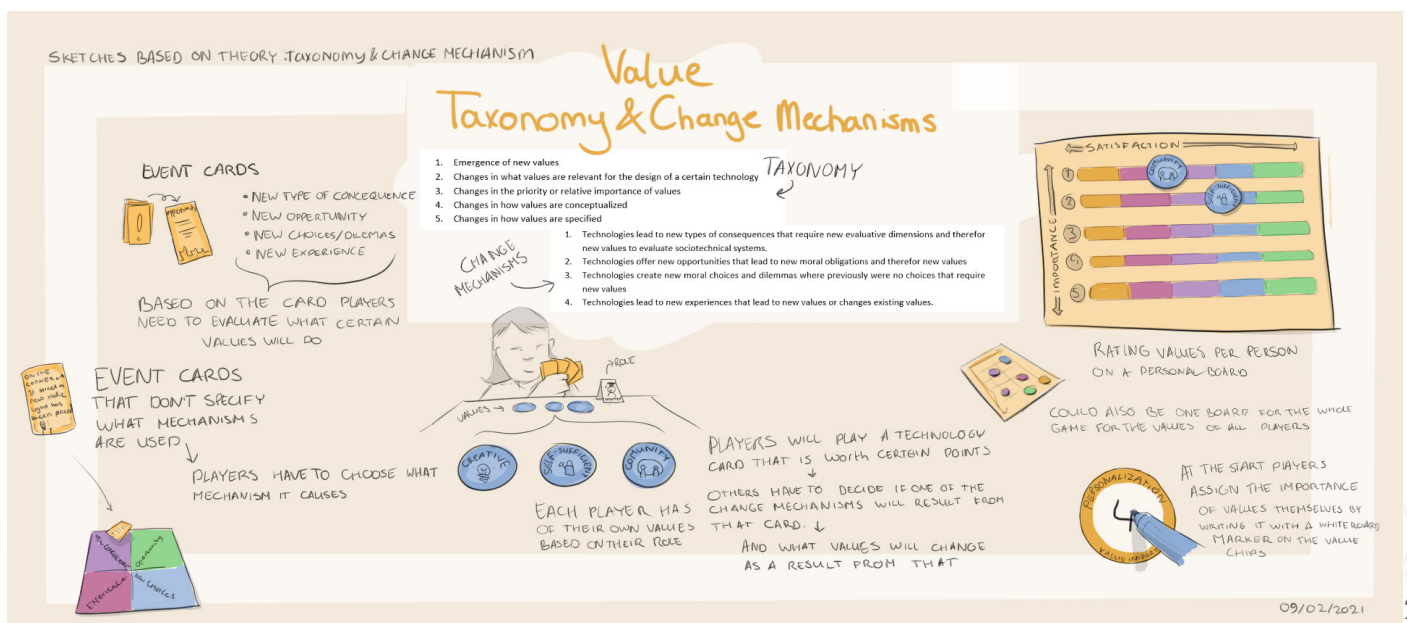
Figure 10: Value taxonomy and change mechanisms exploration

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Values that matter

Another similar exploration was done for the Values that Matter (Smits et al., 2019) design method and can be seen in figure 11. In this case, the different phases for the method was used as a basis for the main game dynamic. For example, the game could consist of four rounds that represent the four different phases of the method. In the method, the last three phases can be looped and repeated until a desired result is reached. In the game, a similar repetition of the last three rounds could occur until all the players are satisfied with the results. Similarly, a multi-layered board could be used to represent the different rounds based on the phases of the method. If the first round is completed, the first board can be removed to reveal the second round board and so on. This will encourage the players to look at the development of a smart city project from different angles.
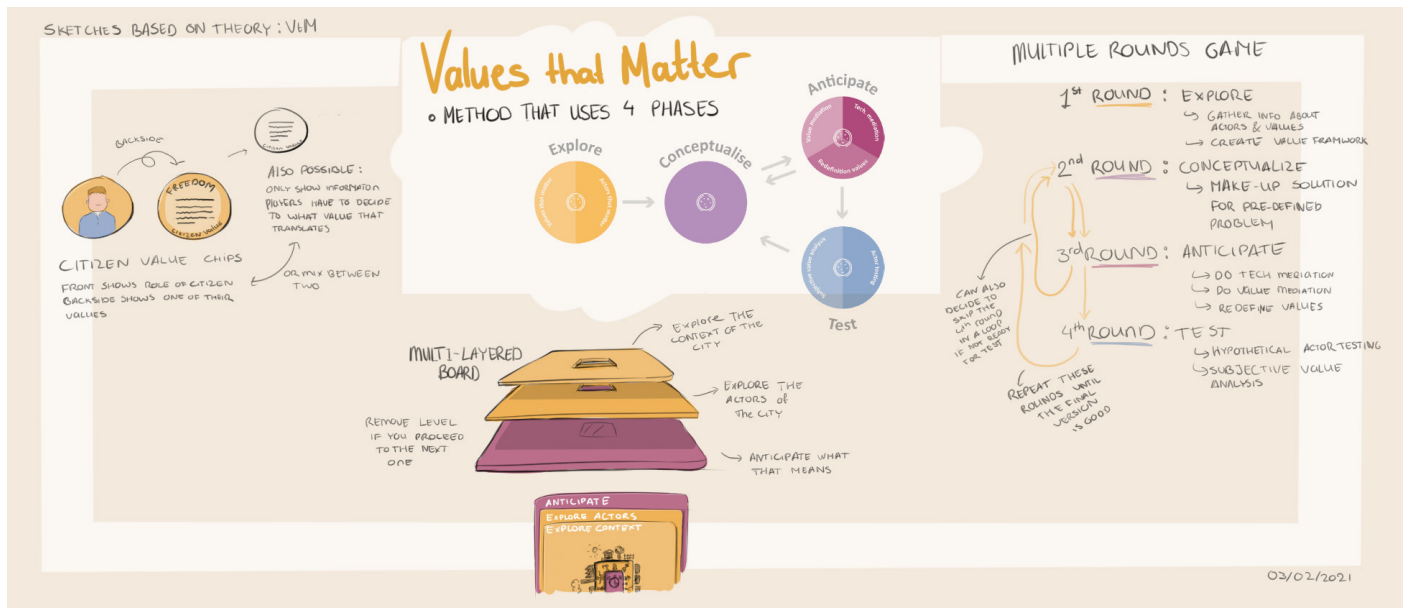
Figure 11: Values that matter exploration

First ideation on different aspects of the smart city game

Each actor that gets involved will have their own input and their own values. This is an important aspect of smart city development that is concerned with values and value change. Therefore, this is also an important aspect for the to be designed smart city game. How this aspect can be reflected in a game element has yet to be decided. To explore the possibilities a small ideation was done regarding elements like roles, values, value change over time and context visualisation.

Roles

This first ideation was done on the different roles actors play in a smart city project and how this can be implemented in a game. First of all, the amount of people playing the game determines a great deal about the game dynamic. Therefore, it also influences how different actors can be represented in the game. For now, five players will be set to play the game until another number proves to be better. Five players will provide a group in which players can be actively involved in a discussion, but still have a variety of people playing it to provide different perspectives.

Building upon the idea of having five players to play the game, the ideation focuses on how different actors can be represented. It also focuses on how the decision can be made to involve other actors, reflecting that important aspect in the game as well. The visual ideation can be seen in figure 12. The first part, representing different actors, can be done by a so called 'keycord' idea. With this idea, each player will

be assigned a role randomly which can be displayed on keycords worn by all players. This can be seen in the sketch below. Roles the player could get assigned can be "Head of smart city project working for the municipality" , "CEO of a tech company" or "Parent of three children". Ideally, over the different roles the quadruple helix is represented , but realistically this will not happen all the time. Therefore, by assigning roles randomly, it could happen that the players form a diverse team, but this can also be not the case. Either way, it will be up to the players how the handle each role composition. The card of a role that the player gets assigned to can be put into the keycord card holder as can be seen on the right of figure 12. This way, the other players can see clearly which role belongs to who.

To implement the important possibility of actors getting involved later in a smart city project, these same actor or role cards can be encountered later on in the game. This could be through a mixed deck consists not only of actors cards, but also of other cards. Occasionally, an extra actor card could appear and the players will have to decide if they want to include that actor in their team or not. To visualize that and use real life context, the back of these actor cards can visualize an incoming call from an unknown number. The players can decide to 'accept' or 'decline' the call. This means that if they accept the call, they can turn the card over and see who the actor is. The players can choose whether or not they want this actor to get involved in their smart city project. This will invoke a discussion why it can be useful to include the views and values of that actor, or why it would be okay to dismiss the actor.
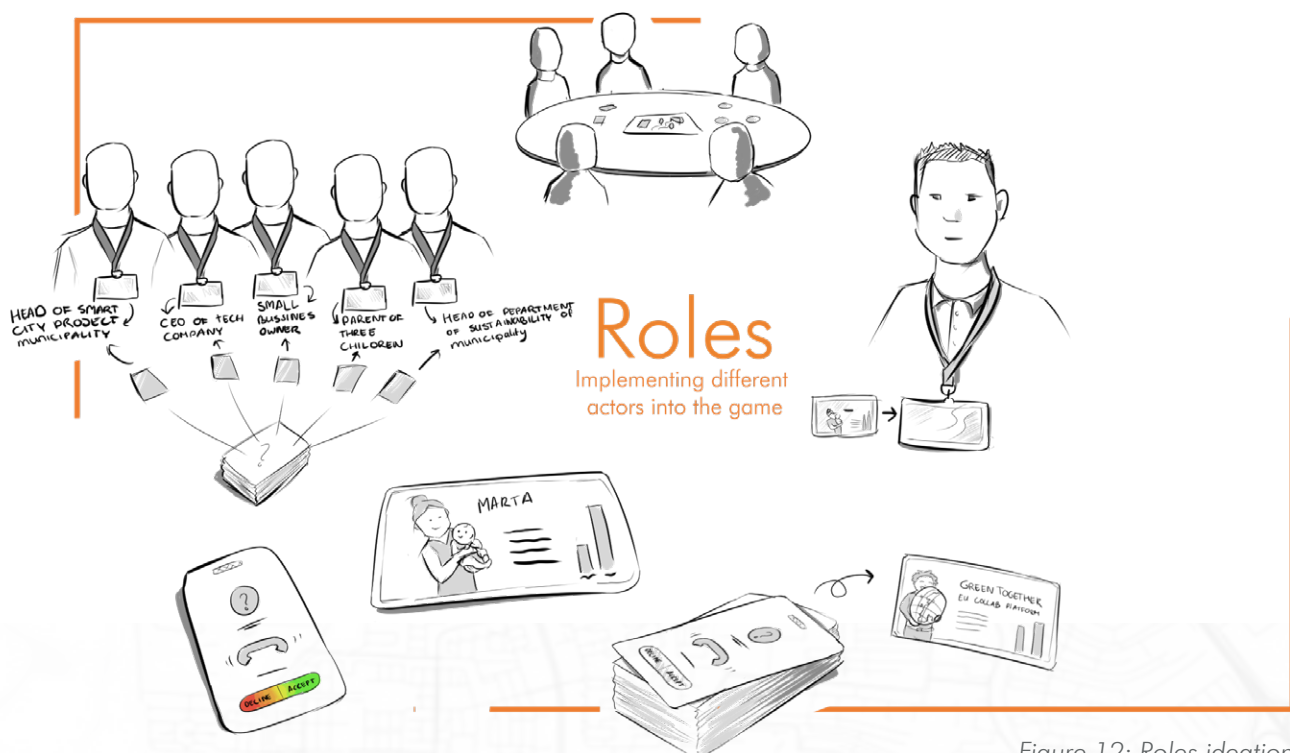
Figure 12: Roles ideation

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Values

The idea of a keycord is also used in the ideation of values and how to order the values to their importance according to the actor. Specifically the band of the keycord can be used as a gradation to order personal values from most important to less important. Rather than laying the values in front of the player on the table, the values, displayed as badges, can be attached to the band. Thereby placing the most important one on top and less important ones lower on the band. This idea is displayed at the bottom of figure 13.

Another way of ascribing value to the values is by giving them a numeric value. The players will at the start of the game write on a value how important it is to them on a scale of, for example, 1 to 10. If throughout the game the value importance changes the number can simply be rewritten.

To display the importance of values more graphically then numeric, a board can be used as shown on the far right of figure 13. Values that are placed higher on the board are considered more important than ones placed lower on the board. An extra dimension that can added to this board is to add a horizontal axis displaying the satisfaction of the values. What is meant by that is how the player feels the value is represented in the choices made throughout the game. The player can then change at any time of the game how they feel that their value is taken seriously at that point in the game.

Changing values

In figure 14 other sketches exploring ways to express value change in game elements can be seen. These sketches were based on the Values that Matter literature that focusses on anticipating value change. This can be done by assessing whether a value is enhanced, threatened or transformed by a new technology. In a game setting cards for different technologies can be made. Each player would then have to asses if a certain value is enhanced, threatened or transformed because of a value. Different ways to do this as a game can be seen in these sketches.

Interpretting values

How people interpret values is also a part of understanding values and value changes. One idea to show value interpretation in a game is by using images as can be seen in figure 15.
The players can show how they interpret a certain value by choosing a picture that represents the value in their eyes and placing it on their value card. If over time during the game, their interpretation or understanding of the value changes, they can place a new picture on their value card. At the end of the game, the amount of pictures on a value card shows how often the value interpretation of the player has changed.
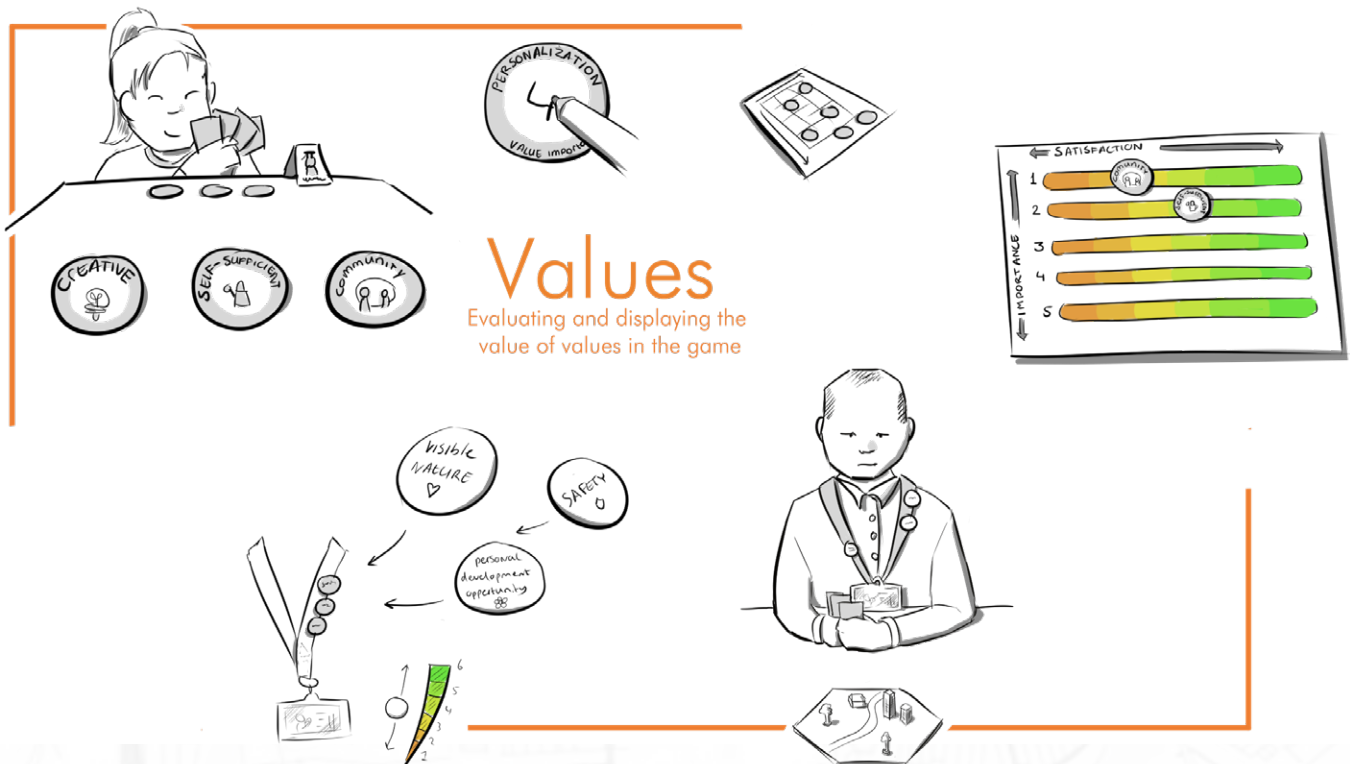
Figure 13: Values Ideation

Anticipating values in Smart city projects
Using elements from Values that Matter

MULTIPLE TECHNOLOGY CARS FORM A SMART CITY PROJECT
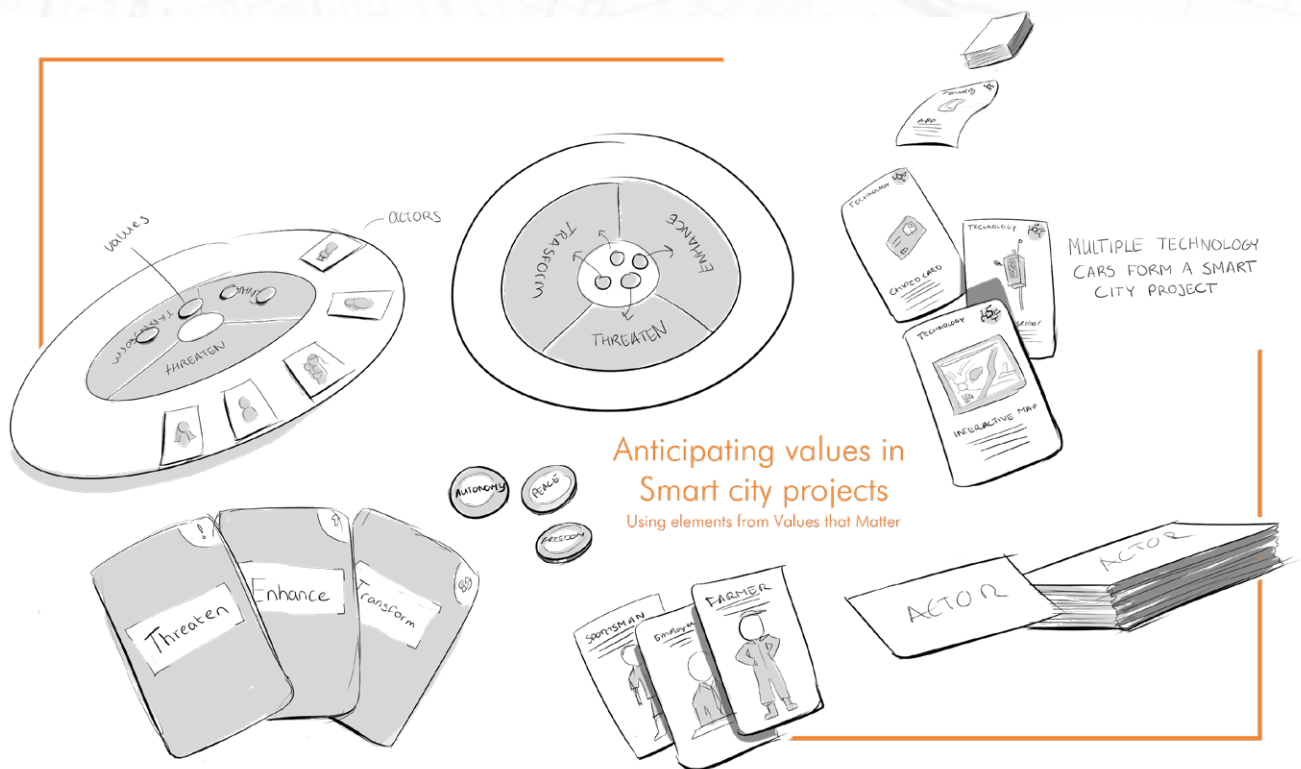
Figure 14: Anticipating values in smart city projects ideation

Interpretting Values

Show interpretation of values using pictures

if interpretation changes a new image can be placed over the old one

At the end of the game, the amount of pictures shows how often the value has changed
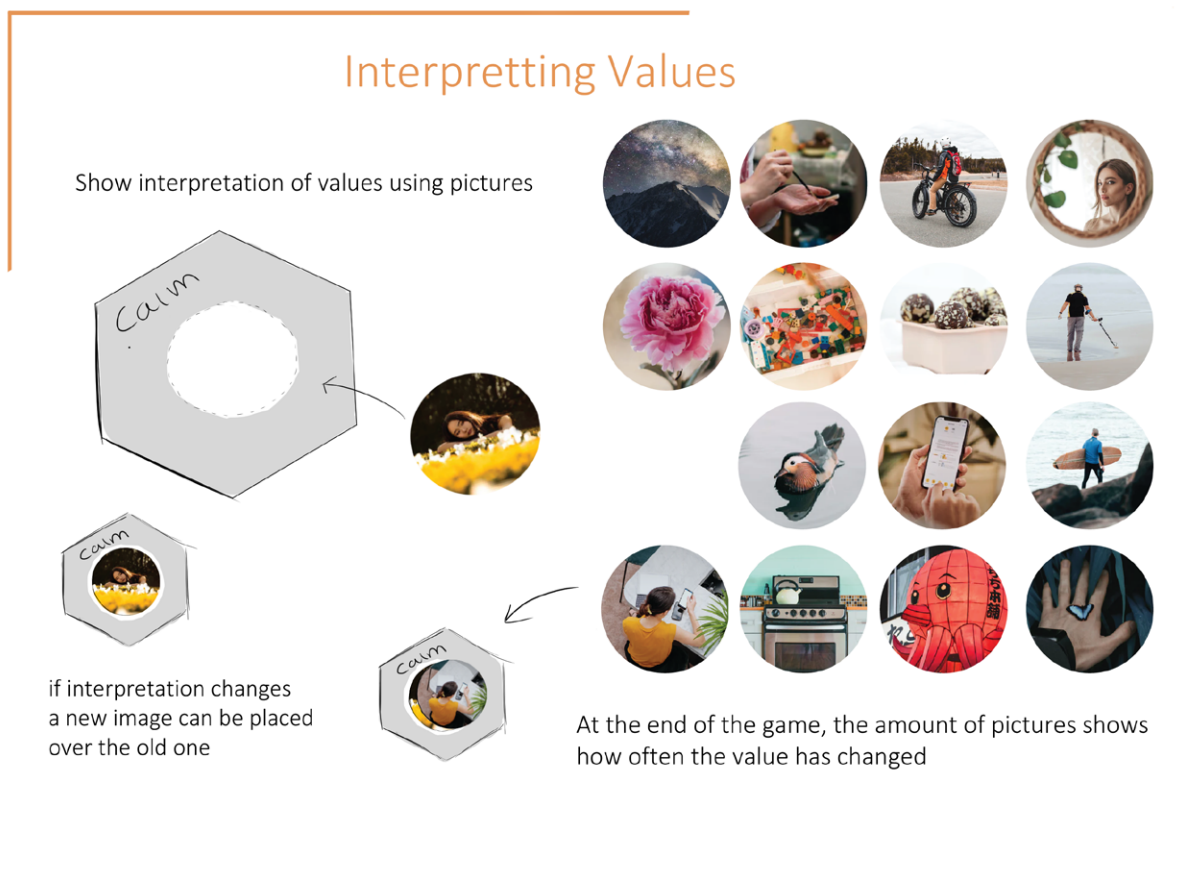
Figure 15: Interpretting values idea

City representation

Not only actors and values need to be represented in the game. The city itself also needs to be represented. There are a lot of games in existence that are based on cities or other geographical elements. To gain some inspiration from those exiting games, the collage found in figure 16 was made. In this collage you can see how other board game developers designed geographical elements in a game, but also board games that have an interesting and unique design.

Using the collage as inspiration, the first sketches for a board as city representation was made. An aspect that should be included in the design is how cities change over time. This could be done with different layers of the board as can be seen in the middle of figure 17. Each layer will stand for a year. It can also be displayed as a linear line or as tiles that are added over time.

Another aspect of the city that is important to smart technology choices in the city is that changes made to the city are hard to reverse. When a choice is made for a new smart technology to be implemented in the city, it cannot be easily removed once it is placed. These consequences of choices made is what the sketches in figure 18 are based on.

Figure 16: Existing board games exploration

Boards
Visualizing a smart city context
into a board/centerpiece
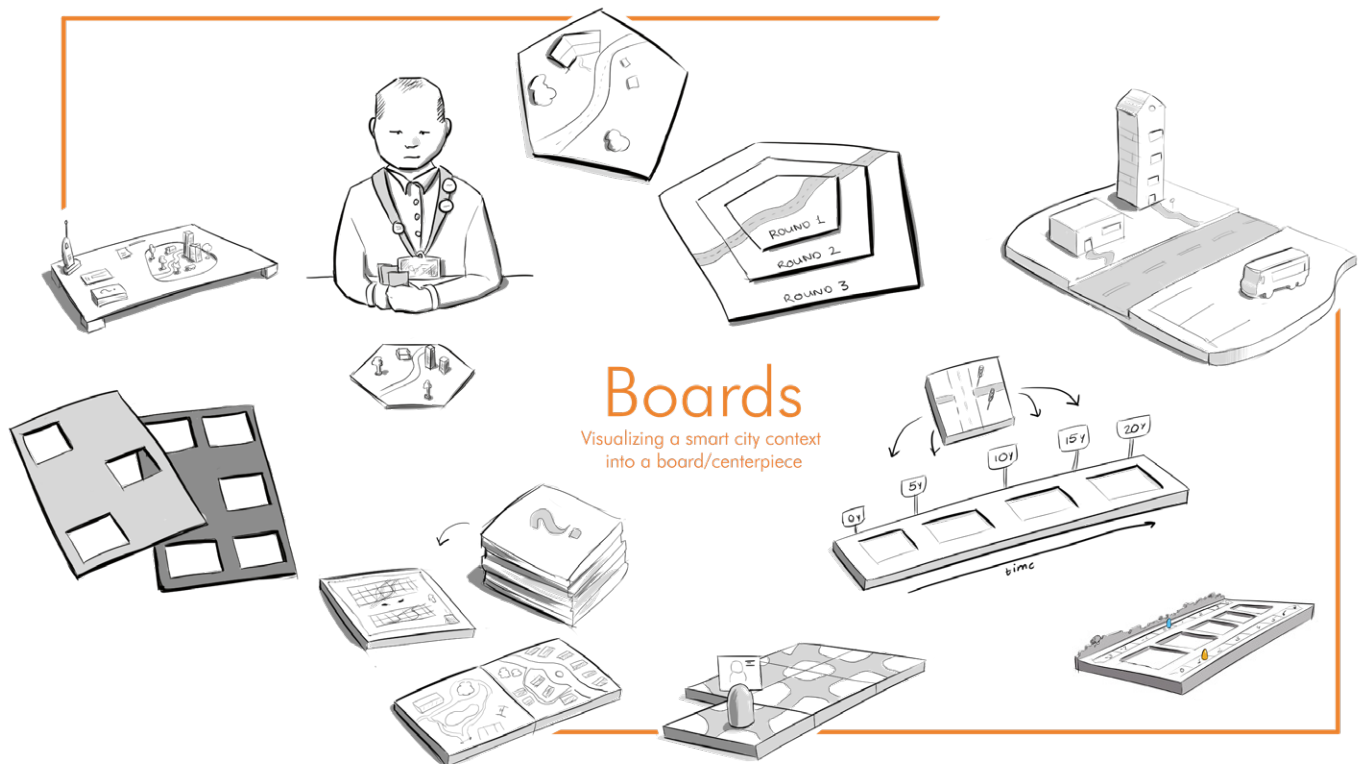
Figure 17: City representation through board design ideation
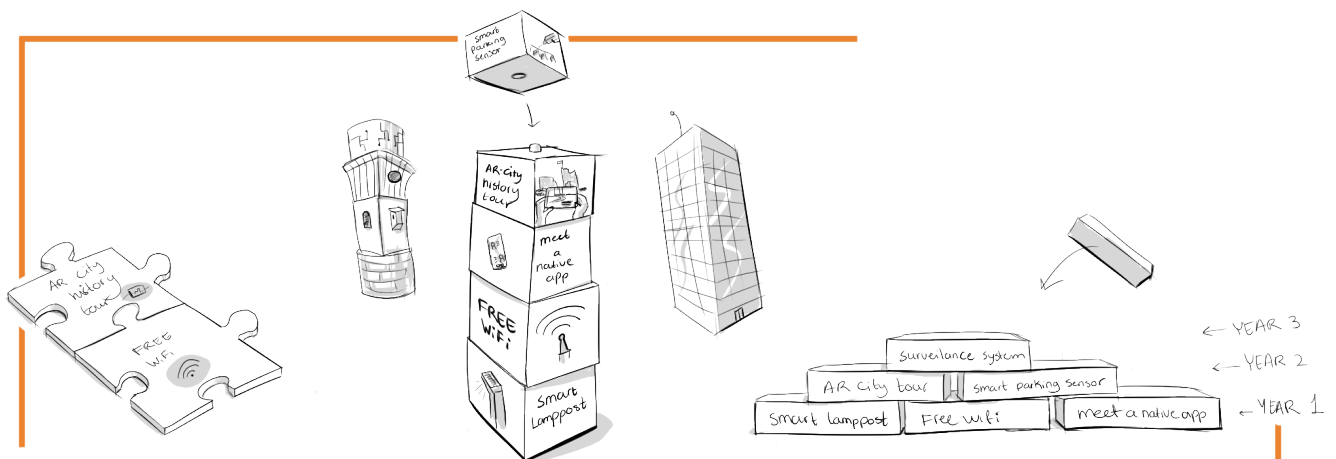
Choices made are hard to reverse
Representing that choices made at the
beginning of developing a city have a lasting
effect on the city in the future

Figure 18: Consequences of choices ideation

First complete concept

The initial ideas and sketches form ideas for elements of the game, but they do not form a game yet. By combining the ideas and figuring out how those can be used to make a playable game the first game iteration came to be. A scenario of how the game mechanics work can be seen in figure 19. This concept will be used to go through several iteration of testing and redesign as can be read in the next chapter.

Game scenario

The ultimate goal will be to righlty balance technologcal advancements
and the representation of citizen values in the city

Phase one: value assignment

At the beginning of the game each
player will be dealth a character card
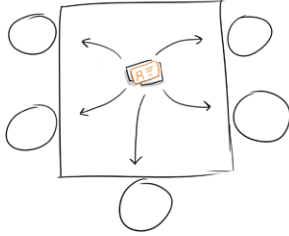
Based on the information on the card
the players will have to decide what
values are important to their character

If everyone has chosen the core values for the
characters, the players have to decide who of
their characters has the most influence. This
player will be made mayor

The mayor will have to make the final
dicisions in the next phase of the game

Phase two: city development

At the start each player is given
1 agree, 1 disagree and 1 talk card

The mayor will start by drawing one
'smart initiative card'. This is a card
describing an initiative and its benefits
for the city

Each player must decide for their role
whenever the initiative has a positive
effect on their values or a nagative.
They can voice their thoughts by using
the talk card.

When using a talk card, they can only
talk until someone else takes a turn
speaking. Then they have to remain
silent unless they have another talk card.

If everyone is done talking, each player
will place a card upside down on the table
to decide if they agree with the initiative to
be in the city or if they disagree.
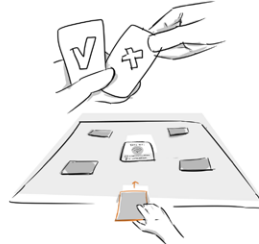
The mayor will decide if the city will
incorporate the initiative or not before
the agree and disagree cards are shown.
After the mayor has made this known the
players can show if they agreed or disagreed

These cards do not need to be played
in a particular order
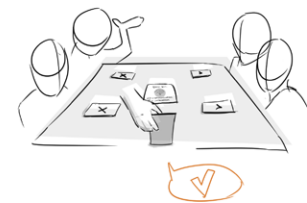
All players are alowed to talk now

The decision of the mayor is final,
even if all the other players disagree.
If the initiative is rejected the city will
not get any penalties, but also no
technological advancement points
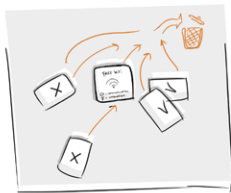
If the initiative is build, this means that
the city will gain technological
advancement points, but every disagree
card will be counted as an "unheard penalty"

If there are too many penalties in the game
there will be a riot. This devaluates the city
and a new mayor will have to be chosen
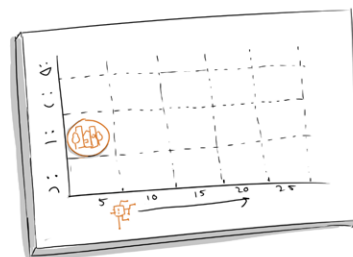
Figure 19: Game scenario

The scenario that ended the previous chapter was made into an actual prototype. This prototype is the start of the iterative design process Each new iteration will be made into a prototype, tested, evaluated and redesigned to be made again into a prototype for a new cycle. Testing in game design is very important as Harteveld also explains(Harteveld, 2011). In an ideal world, these test are done with the intended target group and with the right amount of people. However, this is not an ideal world and to save resources and to adjust to more accessible possibilities the test will be done with available volunteers. Moreover, some tests will gain the same needed insights with less resources, for example less players, or only part of the gameplay, instead of the intended amount of players.

The following section will describe iteration one in more detail.

The protype of iteration one consists of several role cards, technology cards, values cards and talk, for and against cards. All the elements can be seen in figure 21

The role cards and the technology cards are a more advanced than the other cards and took more time to design. First of all the role cards: For this iteration seven characteristics where chosen (job, age, gender, education level, household, perceived health and digital skill). Those where based on what characteristics influences values the most in research on values. The characteristics that seemed to be most related in defining a person's values are their health, but in literature a distinction is often made between age, gender, education level, health literacy and digital literacy (M. Smits, personal communication, May 27, 2021). This was combined with statistics of the Netherlands from the CBS of how the demographic distribution of these characteristics is within the Netherlands. For example, 29% of people in the Netherlands had a low education level in the year 2020 (Centraal Bureau voor de Statistiek, n.d.). With a game that has eight role cards, this means that two of the roles will have that specific education level. An overview of the gathered data can be found in appendix B.

The technology cards are partly based on existing smart technologies for cities based on a report by McKinsey Global institute (2018). The other part of the technology cards are based on speculative future technologies. These are inspired by a brainstorm

activity held with six participants that encouraged them to come up with future technologies for cities. To keep in the style of gamification, this brainstorm activity was made playful by using the metaphor of a menu. The appetizer of this menu was a warming up for the participants to let them get familiar with the subject of future technology. The main course was the main brainstorm activity. The participants could choose to brainstorm about possible future technologies based on dish one: a list of emerging technology categories, and/or dish two: the sustainable development goals of the United Nations. Participants were asked to write and possibly draw their ideas on the same paper as participants before them had done. To end the brainstorm, the dessert of this activity was to look back at all the speculative future technology ideas. The participants had to rate if they were against or in favour of the implementation of such a technology. An image of the brainstorm menu can be found in figure 20, the full version can be found in appendix C and the results can be found in appendix D.

On each technology card can be found if the technology is current, and thus based on existing projects, or futuristic and thus based on the brainstorm.

During the creation of the prototype it was decided that for each value card a player chooses for their role, they need to choose a picture that represents what the value means to them. This to show that the interpretation of a value will differ per person and can change over time. The player is therefore allowed, and even encouraged, to change the interpretation of their values by choosing a different picture during the gameplay if a new technology is added to the city.

Picture cards of an existing game were used as those value interpretation cards for this prototype as. For the value cards a selection was made from a list of multiple values people can have and printed as cards.

Last of all, the simple talk cards, agree cards and disagree cards where designed for the prototype of the

first iteration of the game.

Figure 20: Futurisic futures brainstorm activity handout

Iteration 1

Order/information card

Role card

Technology card

Agree & disagree cards

value cards

talk card

value interpretation cards

Figure 21: All elements of iteration 1

Test

The aim of this first playtest is to see if the game mechanics work, or if there are any undefined parts that prevent the game from being playable. The following aspects will be part of this playtest:

- Taking on, and being assigned a role

- Finding values that fit the given role
  - How many values should each player choose?

- Choosing pictures to represent the values

- Drawing technology cards and choosing one for the city.
  - How many cards should be drawn/how many options to choose from should there be?

- Voting for the technology and making a decision
  - What happens if a technology is added to the city, and what if it is discarded
  - How does that affect the agree and disagree votes?
  - How does it affect the values of the (roles of the) players?

Type: Individual playtest*
*When during the iterative process it is mentioned that the type of test is an 'individual playtest' this means that I as the designer playtested the iteration individually. This is less trustworthy then testing with participants. However, the test is still useful, especially since finding participants at the time of testing was a challenge and not always possible due to governmental restrictions needed to reduce the risks of the COVID-19 pandemic.

The set-up of the test can be seen in figure 22. For an individual test it was not necessary to include all 5 intended players. But only using one player would not test how multiple people voting for or against a technology works in gameplay. Therefore, an amount of three, fictive, players was selected for this playtest.

The gameplay consisted of playing through (1) the preparation phase: Choosing three values that fit the role and choosing pictures to represent those values for each player; And (2) through multiple rounds of the city development phase: Let the mayor draws three technology cards, choose one for the city and lets the citizens voice their opinion. Citizens do this by using their talk cards, voting for or against the chosen technology based on their values and letting the mayor choose if they want to add the technology to their city or discard it. Within this test, after a technology was added, it was contemplated if the interpretation of the values of the citizens changed because of the new technology. Also, for every disagree vote on a technology that was added to the city, the mayor would receive a penalty. If the penalty bar was full, a new mayor would be re-elected. In this test there was no score keeping since the focus of this playtest was on the general gameplay and not whether the scoring system worked.

Figure 22: Set-up for individual playtest

Evaluation

Each iteration will be evaluated based on a playtest. The way the game is tested will depend on the aim of the test, and the availability of participants. Each category will be evaluated based on the worlds of Triadic Game Design (Harteveld, 2011); reality, meaning and play. With reality the game will be evaluated on how much it represents real life. With meaning the category and its purpose beyond the scope of the game will be evaluated. For roleplay this is, for example, how much the players are able to relate to their role and how much it helps them realize that other people think differently than they do in the real world outside of the game. The world of play evaluated the category purely on the playability.

Each world will be scored from 1 to 5, with 1 meaning poor, 2 mediocre, 3 okay, 4 good and 5 excellent. Each given score will be explained using examples from the test. If a category cannot be evaluated based on the test, the score will be left out.

There are some general aspects of the game that will be present throughout all the iterations, unless a test proves otherwise. The categories based on these aspects will be used for a general evaluation. Each iteration can also have new aspects that need to be evaluated. The categories based on those will be referred to as 'test specific evaluation'. Lastly the three thesis sub-questions are also used to evaluate each iteration. Those will be referred to as 'thesis question evaluation'.

Test specific evaluation

Since this test was focussed mainly on gameplay and tested without participants, the world of meaning was not taken into consideration for the test specific categories. The scoring can be found in table 1.

Category	Category definition	Reality	Play
Voting for technologies	Does the voting with agree and disagree cards work and does it affect the values?	2	4
Drawing technology cards	Mayor drawing three technology cards and choosing one for the city. Is the amount good to make a good choice?	3	2
Choosing values	Is the amount of choosing three values the right amount?	1	1

Table 1: Test specific evaluation of iteration 1

Voting for technologies

The voting for technologies was now done with agree and disagree cards. It was not necessarily voting in the traditional sense, as the mayor made the final decision. But rather a way for the citizens to express their opinions. In reality, each citizen will have an opinion about new changes to the city. They can agree or disagree with a choice that the municipality makes. However, the mayor often does not get to see these opinions as clearly as during this gameplay. Therefore, the reality world of this category was voted as mediocre. The gameplay was straightforward, because placing the agree and disagree cards was easy to do. The mayor could make informed decisions by looking at the cards. Therefore, the world of play got for this category a score of 'good'.

Drawing technology cards

When the mayor draws three technology cards and has to choose one, the choice is not very straightforward. The cards are very similar and are not very revolutionary. The technologies all seem fine for the city. the mayor did not have much to base their choice on. Therefore, drawing three technology cards does not add much to the gameplay. Regarding the world of reality: Municipalities often get multiple offers for new technologies that could possibly be beneficial for the city and have to choose which one they will take seriously and which ones they will discard. Having three technologies to choose from does reflect reality somewhat, but having to choose one not necessarily. Therefore, it reflects realty okay.

Choosing values

Choosing three value cards out of a lot of options was hard. The aim was to choose three that would fit a role. The value cards were however very basic, meaning that almost all values could fit each role. The world of play was therefore scored as poor. In reality a person does not pick a value at some point in their lives. It is formed over the years and is as much part of a person as their characteristics. In the game the players get assigned a role card that includes all their characteristics. If the characteristics have been decided for them already, it would be more consistent if the values have been decided for the players already too. The world of reality was therefore also scored as poor.

General evaluation

The scoring for the genaral evaluation can be found in table 2.

Category	Category definition	Reality	Meaning	play
Roleplay	Being assigned a role and acting as that role throughout the game instead of yourself.	4	2	3
Value interpretation	Have values in the game and interpreting those for your role	2	2	2
Technology	Smart technology in the game of which the impact on the individual and the city is understood	4	---	1
Value impact on technology	Values people have impact how the decisions are made about technologies	3	--	--
Technology impact on values	The technologies added to the city have impact on the values	1	--	--
Goal of the game	The game has a goal and an end state that the players work towards	2	1	1

Table 2: General evaluation of iteration 1

Roleplay
The roles of this iteration were based on characteristics taken from statistics of the Dutch population. The characteristics of the roles were therefore very close to reality and thus a score of good was given. Regarding the world of play, taking on the role is easily understood and making choices based on the characteristics of the role does work too. However, the roles only consist of characteristics and are not made personal, so emphasizing with the role asks a lot of a player's ability to do so. For this reason, the gameplay of the role has been given a score of okay for this category. The meaning beyond the scope of the game for this category, and this test as a whole, was hard to evaluate since there were no external participants. However, presenting roles in the game does touch upon the fact that you are forced to act and think as that role. This challenges the potential players to not only think about what they themselves think would be good, but what others might think too. This is a desired challenge that is hoped to be achieved outside the game as well. Because the potential is there this category was score just a bit higher then poor for roleplay.

Value Interpretation
In this iteration the players had to pick images to explain their interpretation of values. In reality, you do not do that. The way this is done in the game is not very close to reality. But this does show that a value can be interpreted in different ways, therefore the reality scoring for this category is mediocre. Similar to roleplay, there were no external participants to really evaluate the world of meaning. There is a potential for players to realise that people's values can be interpreted differently. Players can take that realisation with them after they have played the game. The scoring for meaning for this category is therefore 'mediocre'. For play, a score of mediocre was chosen also. This because the mechanism of choosing images to resent the interpretation of values worked, but it was not easy to choose images. There were a lot of options and the pictures were very general. A score of 'mediocre' was therefore given for play.

Technology
The technology in this iteration is based on either current existing technologies, or future technologies based on a brainstorm activity with several participants. The technology in the game is therefore very close to reality and was scored 'good'. The gameplay however was scored poor. This because the description of the technology was very general. All the technologies had the same benefit and that was one of the things that made the game not very exciting to play. How much a technology was understood and what this understanding did for participants beyond the scope of the game was hard to judge without external participants. Therefore, the scoring of meaning in this category was left out.

Value impact on technology
In reality, people will let their values guide them in their opinions of everyday things, and also in their opinions about technology. In this iteration each player has values and is asked to let them guide them in choosing to vote for or against a technology. Though in reality the values will not be as clear as they are in game, it will guide people in their voting decisions. Therefore, a score of 'okay' was given. Regarding meaning and play for this category; the score was left empty because without participants playing it cannot be properly evaluated.

Technology impact on value
Meaning and play were not scored either for this category for the same reason as the category of value impact on technology. Regarding the world of reality: Values of people will change slowly over time. The relative importance can change, the interpretation can change or the value can change completely. In this iteration of the game, only the second option, interpretation of values, is supported. But it is only poorly supported. It is provided as an option and the change is not slowly over time, but a choice in the game. Therefore, it was scored poor.

Goal of the game
This iteration is lacking an end state or goal. For the world of play and meaning this means is gets scored 'poor' directly. The world of reality gets scored mediocre because it is not completely unrealistic that a city as not a clear goal, however most municipalities do have certain goals and reasons what they want to achieve within their city.

Thesis question evaluation
This iteration was not evaluated on the thesis question based categories since their evaluation depend heavily on the experience of participants. The scoring can be foundin table 3.

Category	Category definition	Reality	Meaning	Play
Value dynamic impact	Is the impact of value dynamics on the smart city visible	--	--	--
Tangible value dynamics	Are the game elements helping in making value dynamics tangible	--	--	--
Engage in conversation	Do the game mechanics help the players engage in conversation about technologies and value dynamics	--	--	--

Table 3: Thesis question evaluation of iteration 1

These evaluation points are used as input for the next iteration.

All the elements of iteration 2 can be seen in figure 24. For the second iteration, the first iteration was adjusted according to the evaluation. First of all, the values will not be chosen by the players, but randomly given to the players at the start of the game. It is still up to the players to choose the value interpretation images that fit their role and values. Secondly, how the mayor needs to present the technology cards and the citizens have to vote. In this iteration, two technology cards will be presented. The citizens will have to place their agree card on one technology and the disagree on the other. Both upside down so their choice is hidden from the other players. After all the votes are cast, the mayor will choose one technology and then reveal the voting results of that particular technology.

A new addition to this iteration, as opposed to the previous one, is a way to manage the score. This is the score of the overall city, and therefore the score for all the players. On the x-axis the so called 'smart city points' are displayed. This will start at zero and each time a new technology is added to the city it goes up by one point. On the y-axis the city value is displayed. This represents how happy citizens are with the city. It starts in the middle and every time a new technology is introduced, it goes down for every 'against' vote casted on that technology and goes up for every 'for' card casted. For example, if a technology is accepted that has five votes of which three are 'for' and two are 'against', the city value will go up by one. It will be the aim of all players to try to achieve a high amount of smart city points without compromising the city value.

With this iteration, a new type of cards is introduced. These are the event cards. There are two different types: personal events and city events. The city events are added to give the different technology cards in the game a bigger role. Each technology is now given a category that is useful for specific events. An example of an event is "a big European event comes to your city". This gives the city opportunities and, therefore, can give the city an additional two smart city points. But only if the city is well prepared. This mean that the city needs to have certain technologies installed in the city. For the European event example, a safety and a waste disposal technology cards are needed. This means that only if a technology card of the category 'safety' and a technology card of 'waste disposal' is implemented in the city those two extra points will be added to the total of the smart city points.

The other event cards are the personal event cards. The event corresponds to one of the characteristics of the role of the players. If one of the characteristics changes, the player's view on technologies and, therefore, also their values can change. An example of such an event is "you have achieved a diploma while doing an evening course, your education level goes up". This event card can be placed under the role card as can be seen in figure 23

The two types of event cards are placed in the same stack as the technology cards. This means that the mayor can draw an event card instead of a technology card. When that happens, a city event card is placed open on the table and will remain in the city. When a personal event card is drawn, a dice will be thrown to decide which player gets the event.

The game ends when five technology cards have been implemented in the city.

Figure 23: Personal event cards in use

Iteration 2

Value cards

Role card

Technology card

Value interpretation cards

Self-Respect
Loyalty
Family
Justice
Respect

Buschauffeur

52 | M

education level | household

perceived health | digital skill

toekomst
TECH

Drone bezorgdienst

Door de stad heen zullen drones ingezet kunnen worden die in plaats van bestelbusjes pakketjes kunnen bezorgen bij mensen thuis

waardering + (⌣ -☹)

dienst

PERSOONLIJKE GEBEURTENIS

Je hebt een avondcursus gedaan en hebt een diploma gehaald! Je education level gaat één omhoog.

Education level
+1

Plaats rolkaart hier

Personal event card

Score card

WAARDERING VAN DE STAD

4 3 2 1 0 -1 -2 -3 -4

1 2 3 4 5 6 7 8 9
SMART CITY PUNTEN

STADSGEBEURTENIS

Een groot Europees evenement komt naar jullie stad. Dit levert bonuspunten op wanneer jullie een afval technologie en een veiligheid technologie in de stad hebben

Indien veiligheid en afval in de stad aanwezig zijn

+ 2 punten

City event card

VOORBEREIDING
GENEGEERD:

1 **Burgerschap**
Elke speler trekt een rolkaart en kiest 3 waarden voor hun rol. Daarbij leiden ze voor elke een afbeeldingen die de betekenis van de waarde beschrijft. Deze keuze leggen ze uit aan de andere spelers. Elke speler krijgt ook 1 eenskaart, 1 oneenskaart en 1 praatkaart.

2 **Verkiezing**
Er moet een burgemeester worden gekozen. Op basis van hun rol stemmen de spelers naar eigen inzicht op de beste kandidaat. De speler met de meeste stemmen wordt burgemeester en krijgt deze kaart.

STADSONTWIKKELING

1 Burgemeester trekt 3 tech kaarten en kiest er 1 voor de stad

2 Burgemeester legt uit waarom technologie gunstig is voor de stad

3 Burgers gebruiken hun praatkaart 1x om input te geven

4 Burgers gebruiken hun eens- of oneenskaart om een gesloten stem uit te brengen voor of tegen de tech

5 Tech wordt afgelegd of toegevoegd aan de stad op basis van de keuze van de burgemeester
bij aflegging: geen smart punten verdiend, maar ook geen waarde verloren
bij toevoeging: smart punten verdiend, + negeerfiche voor elke oneens
(als iedereen het met elkaar eens is mag er 1 fiche worden weggehaald)

6 Als een nieuwe technologie wordt toegevoegd, mogen spelers hun waarden her-evalueren

HER-VERKIEZING WANNEER VOL

Order/ information card

Talk card

Agree & disagree cards

Figure 24: All elements of iteration 2

Test

The aim of this playtest is observe the interaction of the different roles. Is the game clear to outsiders and how is the playability of different elements of the game. The following aspects will be important parts of this playtest:

- Getting assigned a role and three values and choosing fitting images to interpret the value

- Making choices in the game based on assigned role and corresponding values

- Taking on the role as a mayor
  - Is it clear what he/she is supposed to do?

- Interaction between the players
  - Talking using the talk cards
  - Is there a discussion going, do players make choices as their role?

- Voting for the technologies
  - Are the technologies clear?
  - Do the results vary and how is it for the participants to vote?

- Value changes

- City events and personal events

- Are there inconsistencies or undefined rules that need to be defined for the game to be playable.

Type: Test with 4 participants

During the test each player was given a role and three values. The players then had to choose from a stack of images which images would fit the values of their role. They then had to explain why they choose those images and how they interpreted the values. The role they thought would fit a mayor the best was then given the additional role of mayor.

When this preparation phase was done the mayor would draw two technology cards from the stack and presented them to the city explaining why they thought the technology would benefit the city. Each player then would use their talk card to explain what they would chose and after everyone was done speaking the voting started. This meant that every player would place a for card upside down on the technology they wanted in the city and a against card upside down on the other technology. The mayor would announce which technology will be implemented in the city and reveal the votes. The score would be adjusted accordingly and they mayor would place the new technology in the middle of the table and discard the other one. For each against card the mayor would get a penalty. After six penalties a new mayor would be re-elected.

This was repeated in the game until five technologies are implemented in the city. During the game play a few event cards appeared too.

Photos from the playtest can be seen in figure 25.

Figure 25: Playtest with participant photos

Evaluation iteration 2

Test specific evaluation

The scoring for the test specific evaluation can be found in table 4.

Category	Category definition	Reality	Meaning	Play
Mayor	Taking on the role as the mayor and understanding what they are supposed to do in the game	4	2	1
City events and personal events	Different event cards that change the city or the characteristics of the roles	4	1	3

Table 4: Test specific evaluation of iteration 2

Mayor

In the current iteration of the game the mayor also has a citizen role. They had to make decisions as the mayor and play as a citizen. When a mayor has made too many decisions that citizens are against there is a riot, and another citizen will take on the role of mayor. This duality of being a citizen with their own values and being a mayor and deciding what is best for the city comes close to reality. Just as the riot is. Reality was scored 'good' because of that. However, the duality proved to be too complicated for the participants playing mayor. Their role as citizen was sometimes neglected to focus on their role as mayor. This did not benefit the game in terms of gameplay and the world of play was therefore scored as 'poor'. The fact that the duality was hard is something the players could learn from the game. Making decisions as a mayor in real life can be hard sometimes. This would be an interesting realisation if regular people are to play the game. However, in the end a initiators of a smart city is supposed to play the game. For them this realisation is less important. Meaning was therefore scored 'mediocre' for this category.

City events and personal events

In this iteration new cards were introduced: the event cards. There were city event cards and personal event cards. The occurrence of personal events and city events did add to the realism of the game and made the citizen roles more interesting. In a city generally events happen, and technology can aid in that event. The world of reality was therefore scored as 'good'. In gameplay the personal event cards did not affect the values of the citizens, but it did influence their technology choices. The participants enjoyed the personal event cards as they could improve their role's characteristics. The city event cards however had much less influence on the gameplay. They were supposed to give the technology more purpose. Unfortunately during the test, no city event card was drawn. Because of this the world of play was scored 'okay'. The purpose of the personal events cards was to show that events can have an effect on values of people. This effect was not seen in the game. The city event cards that should show that the technologies have a useful purpose during events did also not work. Meaning was therefore scored 'poor' for this category.

General evaluation

The scoring for the genaral evaluation can be found in table 5.

Category	Category definition	Reality	Meaning	play
Roleplay	Being assigned a role and acting as that role throughout the game instead of yourself.	3	1	4
Value interpretation	Have values in the game and interpreting those for your role	2	1	2
Technology	Smart technology in the game of which the impact on the individual and the city is understood	3	1	1
Value impact on technology	Values people have impact how the decisions are made about technologies	1	1	1
Technology impact on values	The technologies added to the city have impact on the values	1	1	1
Goal of the game	The game has a goal and an end state that the players work towards	2	2	1

Table 5: General evaluation of iteration 2

Roleplay

Players were able to act as their role and make choice based on their role's characteristics. However, the players' focus was more on the characteristics on the role card than on the values. The values where not as much part of their role as desired. The meaning therefore got a score 'poor'. In reality, the values would be a bigger part of the role. So the score of reality was also lowered to okay compared to the previous iteration. Play got scored a little higher; good. Even though the values did not play an active role, the players were able to act as their role this proved to work in the gameplay. The personal event cards made it more fun for the players to play their role since things could happen to their role. This aspect is what the improved the score.

Value Interpretation

The way the values were interpreted differed not much from the previous iteration, and the test did not show any big differences. The score stayed very similar to the evaluation of iteration 1. Some of the participants did choose interpretation images for their value that were more literal interpretations of the values. This is not very promising for showing that the interpretation of a value depends on a person and that this interpretation can change over time. The world of meaning was, therefore, scored lower than the previous iteration.

Technology

In this iteration the technology cards had not changed much, so the description of technology was still very close to reality. However, to make the gameplay more interesting in this iteration, the players had to choose between two technologies of which one would be implemented in the city and the other discarded. This is not the way it is done in the real world. The scoring for realism has gone down from good to okay because of that. And even though the decision was made for more interesting gameplay, it did not work out. The participants of the test said that they did not feel their choices mattered much as the technologies did not have different impact on them and the city. The world of play was, therefore, still scored as poor. What the players should take out of the game is that technologies are not neutral and they impact lives one way or another. Since the players did feel the opposite of this during the gameplay, namely that it did not matter much what technologies they choose, the world of meaning was also scored 'poor' for this category.

Value impact on technology

In reality values would play a big role in shaping opinions about technologies. During this playtest that was not the case. The values played some role, but that had very little to do with the actual technologies. Only the mayor referred to the values of others in making decisions about technologies. Reality, meaning and play were therefore all scored 'poor'.

The players were asked during the playtest if they wanted to change their value interpretations after a technology was introduced, but none of the players did. Meaning and play was scored 'poor' because of that. For the world of reality, not much has changed since the previous iteration for this category the score of 'poor' stayed the same.

Goal of the game
In this iteration, as opposed to the previous one, there was a scoring system and a set end state of the game. However, the participants did not understand the scoring system. That is why it was still scored 'poor' for the world of play. The scoring should show that the challenge is to balance technology advantages and values of people, a thing cities attempt too. It somehow did, but very poorly. Meaning and reality was scored 'mediocre' because of that.

Thesis question evaluation
Because this iteration was tested with participants, it can be evaluated on the thesis question based categories. The results can be found in table 6.

Category	Category definition	Reality	Meaning	Play
Value dynamic impact	Is the impact of value dynamics on the smart city visible	1	1	1
Tangible value dynamics	Are the game elements helping in making value dynamics tangible	2	1	2
Engage in conversation	Do the game mechanics help the players engage in conversation about technologies and value dynamics	1	1	2

Table 6: Thesis question evaluation of iteration 2

Value dynamic impact
During the playtest it became clear that participants did not feel the need to change their values or interpretation thereof during the game. Value dynamics and its impact on the city was therefore not seen at all. That is why every world for this category was scored poor.

Tangible values dynamics
Since the value dynamics are not made visible, they are not tangible either. The only game element that was used to aid in making value change tangible is using images to show each person can interpret values differently. The element worked at the beginning of the game, but did not aid in showing value change. Play it was therefore scored 'mediocre'. Because none of the players used the element of the value interpretation cards to change their values, the world of meaning was scored 'poor' for this category. Since the value interpretation change was not made tangible enough for the players to use it. The part that citizens interpret values each in their own way resembles reality. The way this is done in the game, with pictures, is a bit less realistic. However, making things tangible is often a different way of making sense of reality. Using pictures is a different way of showing the reality of different interpretations of values. Because it does show this, and unfortunately not the change in this interpretation, reality was scored 'mediocre'.

Engage in conversation
The players communicated in this iteration with so called 'talk cards'. If players wanted to voice their opinions they could use one card to contribute to the conversation. This mechanisms should ensure that everyone played an equal part in the conversation without one person dominating. During the gameplay this worked okay. But because the there was no order of who would talk the players were often unsure who should start speaking. During the conversation the players did not react too much to each other. They all said what they thought. Sometimes the mayor would ask a question. So, the world of play was scored 'mediocre'. The impact of the technologies in the daily lives of the citizens was not visible. This meant that there was not too much to discuss about the technologies. After the game was played the players did talk a bit about their roles and the mayor. But not much about technologies and value dynamics. That is why the world of meaning was scored 'poor' for this category. Using the talk cards to discuss things is not a realistic way of engaging in conversation. A municipality can, however, organize a meeting and invite citizens to voice their opinions. A way to do this is to let people speak when they make it known they want to say something. So, talk cards are not that far from reality, but the whole process with the cards did not feel very natural. That is why the world of reality was scored 'mediocre' for this category.

With this feedback and the conclusions of this playtest the game can be further developed into a new iteration. However, this time not only the evaluation of the previous iteration was used to make a new iteration. The theoretical background was more consulted this time. The feedback on the previous iterations had for the most part to do with the playability and understanding of the game. Whereas the serious aspect of the game, focussing on conveying the relation between value change and technology, should not be forgotten when designing this game.

With the new iteration, some previous aspects where simplified or adjusted to suit the playability better. An example of this was that the player assigned to be mayor will only have that role and will stay mayor for the entire duration of the game. This because the role of the mayor combined with a citizen proved to be too difficult. Though the re-election was a nice element that can reflect the reality of making choices as government that citizens do not agree with, it does not define the goal of the game and, therefore, this change was deemed suitable for the smart city game.

Other parts of the previous iteration were changed in order for it to reflect the theory about value change more. One of the main things that was changed with this reasoning is the replacement of the for and against cards. It was found that a way to reflect whether the changes of values due to technology are desirable or not, is to assess whether a technology has a positive effect or a negative one on a value (Smits et al., 2019). To implement this in the game, positive and negative chips for each player were introduced. When a new technology appears the player can place a negative or a positive chip on the technology if they think the technology will affect their values positive or negative way. This way the values are more involved in the gameplay while at the same reflecting the theory better. This new iteration will implement, or not implement technology similar to the first iteration: the players asses the positive and negative effects on their values for only one technology. The mayor will then decide whether or not to implement the technology. In this iteration the mayor will only draw one technology card.

Another change can be found in the technology cards themselves. To let the technologies have more impact on the players and their values, they were rewritten and each technology now has an explanation of how it will affect the city and the lives of the player's role. The aim of this redesign is to make the technology cards more personal for the player to aid them in their decision making on whether they want the technology in the city or not.

Cards from the previous iteration that have remained the same are the city event cards. The personal event cards have been left out, however, to not over complicate the game.

To make the connection between the values and the role of the player stronger a, layout was made on which the player can place all their personal cards like their role, values, value interpretation cards and chips.

The mayor also has their own layout, but with an extra feature. To differentiate the technology cards a bit more the mayor can at the start of a round decide for which technology category they want to ask for a subsidy. The can do this by placing a multiplier chip on that category visible on the mayor layout. When a technology of the category is implemented in the city on which the multiplier chip is placed, the city gains twice as much smart city points. On the mayor layout is currently also space for a value card. This can be a value that the city has voted to suit the city, or space for a background/story card to give the city more substance. The latter has not been designed yet, as it was not the main design focus for this iteration but still regarded as a possibility.

The last big difference in this iteration as opposed to the previous ones is the inclusion of a board. With this board the players have a central point to focus on and it will help them keep track of the score better. With this board, the balance between the city value/satisfaction and the development of the city can be observed. The game the score of the city development starts at the first square and the city value/satisfaction starts at the middle one. To show the connection between the technology and the value/satisfaction of the city, the two paths cross. At that point the city development can only gain more points if the city satisfaction is high enough. Five building slots can be seen on this board. This indicates the maximum amount of smart city technologies that can be implemented in the city. This is also the reason that there are less technology cards needed in the game, therefore only one of each category is present in the game. The game ends when all the slots are filled. At that point in the game the achieved city development and city value/satisfaction will be evaluated on whether they are agreeable to the citizens or not. The game can also end when the city value/satisfaction has reached the lowest score. In this case the citizens are so unhappy with the city that they will leave and the game is lost.

All the elements of the game can be found in figure 26.

Iteration 3

Value cards

Role card

Citizens layout

Value interpretation cards

Negative & positive chip

Category multiplier

City event card

Mayor layout

(new) Technology card

Board

Buschauffeur

52   M

education level   household

perceived health   digital skill

STADSGEBEURTENIS

toekomst
TECH

Drone bezorgdienst

Wanneer je een pakketje bestelt kan deze zeer snel bezorgd worden met drones naar jouw exacte locatie.

Hierdoor hoeven er minder bestelbusjes op de weg te rijden wat de infrastructuur van de stad verbetert. De drones zijn echter niet geluidloos en het kan vogels en ander wild verjagen.

Afval   BURGERMEESTER   Vervoer

Dienst   Water

Energie   Welzijn

Gemeen-schap   Wonen

Zeer ontevreden inwoners

Maximaal ontwikkelde stad

On-ontwikkelde stad

Maximaal tevreden inwoners

Figure 26: All elements of iteration 3

Test

The aim of the test will be to see if with the new changes the game is still playable and whether there are elements missing or lacking that prevent it from good gameplay. The new role of the values in considering the technologies for the citizens will also be assessed during this test.

- Assessing technologies based on values with the positive and negative chips
  - Does it work with 3 values per person?
  - Do the adjusted technologies show the personal effects better?

- Playing as the mayor
  - How complicated is making decisions about a value based on the citizens' positive and negative chips?
  - Having a city value

- Subsidy multiplier
  - How big is its impact on the game?
  - How can it be used best in the game?

- Board
  - How well does it help keep track of the game's progress?
  - How fast does a pawn move over the 'stadsontwikkeling' and the 'stadswaardering'?

- Maximum amount of building spots
  - How easily are they filled?

- Separate stack of event cards
  - Is it easy to meet a city events requirements?

- Are there inconsistencies or undefined rules that need to be defined for the game to be playable.

Type: Individual playtest.

During this playthrough the game was set up for one mayor and two citizens. The game was simulated from the start of picking images for the values and roles of the citizens. And ended when all the building spots on the board were filled with technology. Photos from this individual playtest can be found in figure 27.
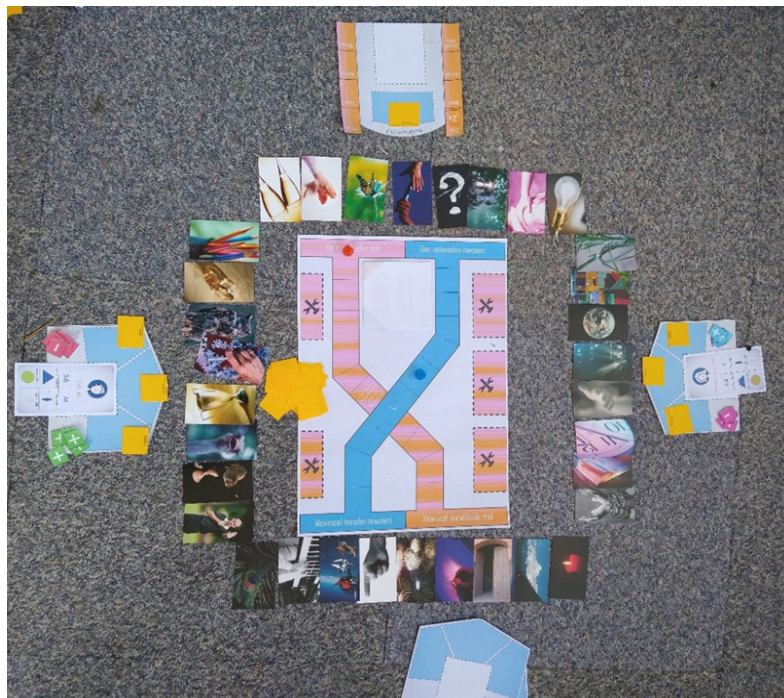
Figure 27: Three photos of the personal playtest

Evaluation iteration 3

Test specific evaluation

For this test the meaning of these test specific evaluation categories could not be properly evaluated without test participants and is therefore left out. The scoring can be seen in table 7.

Category	Category definition	Realty	Play
Mayor	Playing only as mayor	3	4
Subsidy multiplier	Having a subsidy that is connected with the technologies	2	2

Table 7: Test specific evaluation of iteration 3

Mayor

In this iteration the player acting as mayor did not have any other role. This is less realistic then the previous iteration. Also because who the mayor is in the game cannot change. However, the gameplay was improved with this change. The role of the mayor is much more clear. Reality was therefore scored as 'okay' and play as 'good'.

Subsidy multiplier

The subsidy multiplier is now chosen by the mayor at the start of each round. Normally a subsidy would be chosen on a national or international level. The way it is done in the game is therefore not very realistic. The world of reality was thus scored 'mediocre'. For the world of play, the subsidy was an interesting addition. Unfortunately during the testing there was never a subsidy chosen that occurred during the game. The world of play was therefore scored as 'mediocre'.

General evaluation

The scoring for the genaral evaluation can be found in table 8.

Category	Category definition	Reality	Meaning	play
Roleplay	Being assigned a role and acting as that role throughout the game instead of yourself.	4	--	4
Value interpretation	Have values in the game and interpreting those for your role	2	1	2
Technology	Smart technology in the game of which the impact on the individual and the city is understood	4	--	3
Value impact on technology	Values people have impact how the decisions are made about technologies	3	2	2
Technology impact on values	The technologies added to the city have impact on the values	2	-	-
Goal of the game	The game has a goal and an end state that the players work towards	3	2	3

Table 8: General evaluation of iteration 3

Roleplay

Since the previous iteration, not much has changed about the role cards themselves. But the players have been given a layout. On this layout the players have their role in the centre and their values around that role. The values are in this way more connected to the roles. This realism is enhanced by the shape of the layout, which is in the shape of a house. Reality was scored 'good' again. In the gameplay, this new layout was also beneficial. Each player would have a clear overview of their own cards, which should make it easier to act as their role. However, this test was done without external participants. So, whether it worked better than the previous iteration is hard to say. That is why the score remains the same as in the evaluation of the previous iteration. Meaning is not scored since with this test it cannot be seen if the involvement of the values in the roles has increased.

Value Interpretation

The value interpretation mechanism has not changed much apart from where the values can be placed. That is why score for the reality, meaning and play has remained the same as in iteration 2.

Technology

The technology cards have been made more personal. The advantages and disadvantages for the individual and the city is described to give the players an idea of what the impact of the technology will be. This makes the technologies more real then only a short description. For the world of reality for this category, a score of 'good' was given. The more personal technology cards are also good for the world of play. With this iteration the technology cards that are chosen to be in the city are place around the board. There is a limit on how many technology cards can be place around the city. This makes the gameplay more interesting. Moreover, the mayor can decide with the subsidy which technology is worth twice as much development. This makes the technology choices more interesting. It needs to be proved in a test with participants if this is the case for players, but for the potential the world of play for this category is scored 'okay'. The world of meaning could not be evaluated without participants and is therefore left blank.

Value impact on technology

This category is one of those that has undergone the most changes since the previous iteration. By letting know if a possible technology has a positive or a negative impact on your value, values have been given a more active role in the game. The connection between values and technology is shown by letting people asses what it means for their values. Because this connection is shown the world of reality is scored as 'okay' for this category. The gameplay is still a bit complicated. Because each player has three values, the technology needs to be assessed from three different perspectives. This makes the gameplay not only more complicated, but also slow each time all the players need to do that. Therefore, the score of 'mediocre' was given to the world of play. If participants will be more aware of the connection between values and technology needs to be tested with actual participants. But there is now more potential since the connection in the game is visible. Therefore, the world of meaning was scored 'mediocre'.

Technology impact on value

For this category, as was in the previous evaluations of this category, the change of the interpretations in values cannot be evaluated on the world of play and meaning. It needs to be tested with participants in order to properly do that. The impact of technologies on values is partly shown through the impact description on the technology cards. The description of what a technology can do to a persona or the city helps in seeing what it impacts on the life of their role, but not directly on their values. Because of this slight improvement the world of reality was scored 'mediocre'.

Goal of the game

The game now includes a board and a more clear end state. The goal to balance the technology and taking everyone's values into account is now shown on a board. The technology is shown as development of the city. The city starts as a non-developed city and the technologies aid in making the city better developed. The taking into count of values is shown as the city appreciation. When citizens are not happy, the game ends. Or the game ends when the maximum amount of technology has been built in the city. The visualisation of this balance is good for gameplay as the players see what happens when they implement a technology. Though it is left in the open whether players should try to reach the maximum of both. From a gameplay viewpoint having a clear goal is beneficial. From a viewpoint from the world of meaning, the challenge should not be to reach the maximum. This would be too technology push driven. Finding the right balance for a city is what should be aimed for, and what the players should take home from the game. The board is laid out more in favour of trying to reach the maximum, that is why the world of meaning was scored 'mediocre' and the world of play 'okay'. Concerning the world of reality, the connection between the city development and the city appreciation is shown in the way their paths cross. At this spot the development can only continue if citizens are happy. So, there are small things in the goal of the game that are plucked from the world of reality. But how it works in the real world is not that visible. Therefore, the world of reality was scored 'okay'.

Thesis question evaluation

This iteration was not evaluated on the thesis question based categories as can be seen in table 9, since their evaluation depend heavily on the experience of participants. Those were not present during the test.

Category	Category definition	Reality	Meaning	Play
Value dynamic impact	Is the impact of value dynamics on the smart city visible	--	--	--
Tangible value dynamics	Are the game elements helping in making value dynamics tangible	--	--	--
Engage in conversation	Do the game mechanics help the players engage in conversation about technologies and value dynamics	--	--	--

Table 9: Thesis quesetion evaluation of iteration 3

After feedback and evaluation of iteration three, there are several aspects that needed to be changed or adjusted.

These were the following ones:

- Redesigning the communication/discussion aspect of the game

- Focussing more on the connection between people and technologies.

- Connect the participants' actions and decisions to the values

- Make a clear co-operative goal that every participant has an active role in

- Subsidy petitions come from a national source, not from the city

- Changes in the relative importance of values

Redesigning the communication/discussion aspect of the game

Currently the mayor draws and suggest the technologies and the citizens' task is to voice their opinions based on their values. In previous iterations a talk card was present to ensure everyone was given a chance to give input. A different way to give every player a fair chance to add to the discussion is turns. This is a very common game mechanism and was previously not used because the mayor and the citizen had different tasks in the game. The mayor proposed a technology, the citizens voted. However, during the research on how smart city initiatives arise, the municipal officer explained that initiatives not only come from the municipality itself, but also often from citizens and citizen groups themselves. This can be taken into account in the game design. A suitable adjustment for the game will be to let the citizens, as well as the mayor, propose technologies. This will reflect reality, and also give each citizen an active role in shaping the city.

In the last iteration a board was introduced. A board gives the players a central point to focus on. In the last iteration it just showed the city development and the city appreciation. While the thing that binds all players together is the city that they are shaping through the technologies and their values. Therefore, during brainstorming the idea of displaying a city map at the centre of the board arose. This will be the centre of discussion as well.

Focussing more on the connection between people and technologies.

A map at the centre shows that the participants all live in the same city, and that in that place the technologies will be implemented. The technologies themselves are still only descriptions on a card. What interactions players have within the city with the technologies and each other is still not very tangible. To change this, the technologies and the citizens interactions should be added to the map. To do this, the maps should be manipulatable. This can be done by drawing on

the map. Each time a new technology is introduced, it should be marked on the map so the citizens have a clear visual image of what the technology changes to the city. Likewise, the actions of the citizens can be displayed on the map as well. First of all the fact that they live in a city can be made more tangible if each citizens marks a specific house on the map where their role lives. Each role has their own characteristics. So, in addition to marking their house, each role can have a special action that they need to draw on the map. The surgeon, for example, could draw where the hospital is. For another role, the hospital might be important for their health. With this, connections between different roles become a part of the game. By drawing new technologies on the map, for example smart security cameras, the players will see how it impacts their environment and how a technology connects to their role.

Connect the participants' actions and decisions to the values

The values that are currently in the game come from a long list of values. Not all the values are needed to play a diverse game with different values. The value images of the prototypes so far come from a different existing game. To underline that values and how you interpret them shape your actions, more fitting images can be found. Images that reflect what actions you would do because of your value. To find fitting images, a selection of values was first chosen based on a list of common values. This selection was reduced to twenty-one values. Divided over three questionnaires, participants were asked two questions per value: First what they thought the value meant. This could be either what it means for them, or any other meaning they could image the value to have. The second question was what actions they would do because of the described meaning of the value.

The replies of the first and especially the second question were used to find suitable images for each value. For example, some replies on the questions for the value health were: "Eating healthy" and "Being able to dance despite a chronicle illness". Two of the images that are based on the value health that were included in the game, are therefore an image of healthy food and of a dancing person. In total there were 67 images found based on the different answers that participants gave in the questionnaires. The analysis of the answers to the questions can be found in appendix E.

Make a clear co-operative goal that every participant has an active role in

The participants now have a more active role since they will be proposing smart technologies and drawing on the map. But the clear co-operative goal is still missing. The citizens get their values assigned. This

could be an option for a common city value as well, but it would benefit collectiveness and co-operative goal if every player wants to support this city value. Randomly assigned values will not suffice in that case. Since the game will have markers for the map, this marker can also be used to write down a city value or goal. It will be the mayor's task to write down this down, but it should be based on all the values of the citizens. The players will now have a collective important value for the city, but it is not very clear. The collective value is not measurable at the end of the game. It is open for interpretation if this value is embodied in all the choices during the gameplay and in the final city result. To solve this, the city development and city appreciation from the previous iteration comes in to play. The goal of the game should not be to maximize the city appreciation or city development. The goal would be to balance the two. But what balanced means, depends on what the city considers to be important. Therefore, based on the collective city value or goal, the mayor will decide how they want to balance the two. For the city development they write down what they want to reach in the end, and for the city appreciation they will do the same. This way the city will set their own goal and their own terms for success based on their citizens. This goal will be measurable at the end.

The question still remains of when the game ends. To make it a challenge to reach the goal, the players can have a limited amount of time. This can be reflected in the turns. If each turn stands for a year, this city can have seven years for example to try and reach the goals.

Subsidy petitions come from a national source, not from the city

The subsidy was so far chosen by the mayor itself, but in reality the nation organizes this. The mayor, therefore, does not have that much influence on which category will be subsidized. To reflect this in the game the subsidy will be decided by a dice roll. Each turn the dice will be rolled again to see what category will be subsidized by the nation that year.

Changes in the relative importance of values

The value change aspect is currently present in the game through the value interpretation cards. These cards show how the value is interpreted and players are encouraged to change this if they feel like the image does not fit anymore. But a change in the relative importance of values is not represented yet. A citizens is now dealt three values that are placed together on their citizen layout. But which one is more important to their role is not displayed in any way. Therefore, the citizen layout was redesigned to accommodate a hierarchy in values for the citizens.

The process of redesigning this 'citizens house' and the final result can be seen in figure 28.

Because managing three values can be a bit complicated for a player, two values per citizen were chosen instead of one. Both values will play an active role, but the most important value will weigh heavier. Similar to iteration three there will be + chips and − chips. Those will be used to asses whether a possible new technology will have a positive effect on the value or a negative one. But for the first one the chips will be bigger and will have more effect during the implementation of the value. The citizens can keep track of how well their values are represented in the city by placing chips underneath the values if a technology is implemented.

Because there is now a most important value and a second most important value, citizens have to decide which value is which at the beginning of the game. They are encouraged at the start of their turn to change this, especially if several years have passed in the game and if the mayor has accepted new technologies.
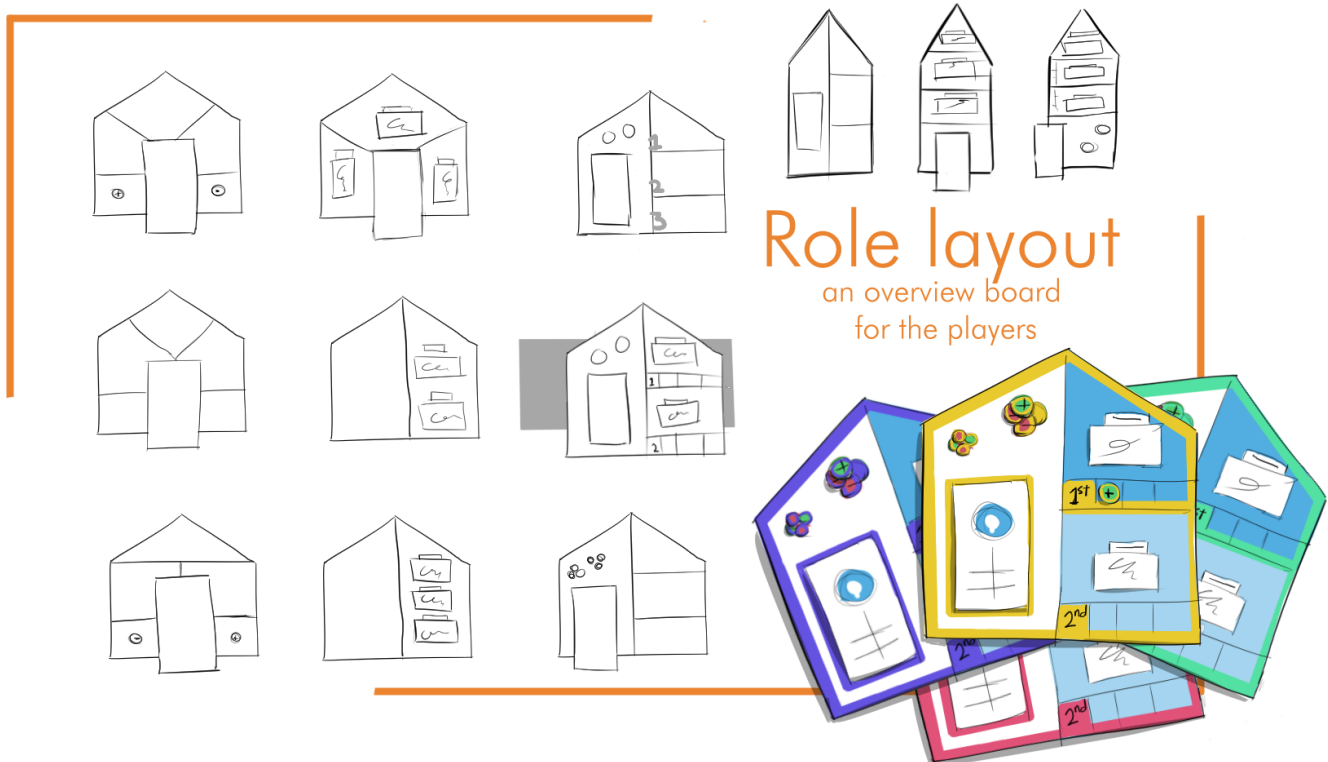
Figure 28: Redesign of the citizen house role layout.

This brings us to iteration 4. The biggest adjustments are the introduction of a map that can be altered collectively, the changed roles of the citizens and the clearer goal of the game. The board was redesigned and now has space for eight technologies around the city. Another big change is the way the cards are drawn. Because of the new layout and to give the players a feeling of choice, the players will not draw the top card of the pile. The technology cards mixed with the event cards are place around the board, facing down. The players will chose one of those cards instead of drawing one from the pile. After choosing a card, a player can decide not to propose the technology and put it back without showing anyone. The player can then do with the information what they want. Maybe there is a better opportunity later for that technology, or they can advise a fellow citizens on whether or not to draw that card. It is an easily understood game mechanic that gives the game a bit more substance and strategy.

The final elements of this iteration can be seen in image 29.

The role cards have also been renewed. Each role has been given more information. They now tell the player in a short sentence a bit more about themselves and they include a drawing task.

After a quick personal playthrough some last adjustments were made. On the mayor house, two spots were made where the mayor can write down the city development goal and the city appreciation goal. And some descriptions on the technology, event and role cards were finetuned to be a bit more to the point.

Iteration 4

City event card

(new) technology card

(new) Role card

Value interpretation cards

Value cards

City development pawn

City appreciation pawn

Big minus & plus chips

Small minus & plus chips

Mayor house

Board with city map

STADSGEBEURTENIS

Een groot Europees evenement komt naar jullie stad. Dit levert bonuspunten op wanneer jullie een afval technologie en een veiligheid technologie in de stad hebben

Indien veiligheid en afval in de stad aanwezig zijn

+ 2 punten

toekomst
TECH

Drone bezorgdienst

Wanneer je een pakketje bestelt kan deze zeer snel bezorgd worden met drones naar jouw exacte locatie.

Hierdoor hoeven er minder bestelbusjes op de weg te rijden wat de infrastructuur van de stad verbetert. De drones zijn echter niet geluidloos en het kan vogels en ander wild verjagen.

De burgermeester geeft aan waar het distributiecentrum zit en inwoners kunnen zo de aanvliegroute van de drones bekijken.

waardering
+ (-)

+1 stadsontwikkeling dienst

55+
Buschauffeur

Omdat je toe was aan een nieuwe uitdaging ben je nu met plezier als buschauffeur aan het werk na eerst iets anders te hebben gedaan.

Geef aan waar je woont en welke busroute je rijdt

PRESTATIE

Wat doe of denk je vanwege deze waarde?

Plaats je afbeelding hier

GEMEENSCHAPPELIJKE WAARDE

Schrijf hierboven een waarde die jullie als inwoners samen delen

Plaats hier geslaagde stadsevenementen

BURGERMEESTER

1e

2e

Figure 29: All elements of iteration 4

57

Test

The aim of the test will be to see how the game is played with participants, especially the first phase of the game and the and discarding, accepting and rejecting a technology. The following will be part of this playtest;

- Choosing values images
- Drawing on the map
- The role of the mayor
- Assessing technologies based on values with the positive and negative chips
- Choosing, understanding and proposing the technologies
- Giving feedback on technology
- Balanced discussion about technology
- General enjoyment of the game
- Are there inconsistencies or undefined rules that need to be defined for the game to be playable

Type: test with three participants

The test was done with three participants aged about 20 One played as the mayor, the others as citizens. Duration of the test was 50 minutes playtime, 25 minutes setting up/feedback.

The participants were asked play the through phase one and complete one year. For this test the decision was made to aid in the explanation of the game instead of letting the players rely on the game manual since the focus of the test was on observing how the players would play the game the way it was intended instead of letting them figure out on their own. This does not mean that a test in which participants need to figure out how the game works based solely on the manual is not considered valuable, but at this stage of the design the player interaction and game mechanics are prioritized for testing.

Evaluation iteration 4

Test specific evaluation

The evaluation of the test specific categories of iteration 4 can be seen in table 10.

Category	Category definition	Reality	Meaning	Play
Co-creating the city	Drawing on the map as citizens and drawing technology on the map	5	4	5
Turns	Each player has a turn	4	--	4
Turns as years	Each turn is a year	4	4	4

Table 10: Test specific evaluation of iteration 4

Co-creating the city

In this iteration the participants had to draw on the map with whiteboard markers. The citizens had to draw the where their role lives and each role had an extra drawing task. The participants were very enthusiastic about drawing on the card and it benefitted the game greatly. The world of play was therefore scored as 'excellent'. Where the roles of the players lived and how the technology could be seen in the city made the development of the city more real for the participants. The world of reality was therefore also scored high with a score of 'excellent'. The map helped the citizens realize that they are the city together and the decisions they made impacted the world for everyone. This is why meaning was scored 'good'.

In the previous iterations the mayor always had the task of drawing technology cards and participants would vote on those. In this iteration participants can also propose technology cards. This causes the world of reality to score 'good'. This because in reality not only municipalities propose technologies, but citizens do as well. This way every citizens has an important role to play and the participants were all involved in the gameplay. That is why play is also scored as 'good'. That every citizen can propose a technology was evident in the game, but whether the participants thought more about it outside of the game was not apparent. Meaning could therefore not be scored for this category.

Turns as years

To make the development of a city more realistic it was introduced that each turn stands for a year. The aim of the game would be to reach a certain goal within a certain amount of years. This made the game more realistic. However, when a player drew a technology card and decided not to propose it, a year went by when nothing happened. Gameplay wise this not very favourable, but realistically also not. That is why it was decided during the test to change the definition of one year as a turn where a technology is proposed. With this new change the world of reality and play was both scored as 'good'. Meaning was also scored as good. The participants connected the years with change when they suggested that their values should change after a set amount of years. Since the values change over time, having a defined time in the game helps to bring across this meaning. The world of meaning was therefore also score 'good' for this category.

General evaluation

The results of the general evaluation of iteration 4 can be seen in table 11.

Category	Category definition	Reality	Meaning	play
Roleplay	Being assigned a role and acting as that role throughout the game instead of yourself.	4	4	4
Value interpretation	Have values in the game and interpreting those for your role	4	3	4
Technology	Smart technology in the game of which the impact on the individual and the city is understood	4	3	4
Value impact on technology	Values people have impact how the decisions are made about technologies	3	4	4
Technology impact on values	The technologies added to the city have impact on the values	2	4	3
Goal of the game	The game has a goal and an end state that the players work towards	4	5	4

Table 11: General evaluation of iteration 4

Roleplay

The participants of the test said that they enjoyed acting as their role, but that it was also challenging. This challenge is a good one for the world of meaning. The game is designed to let you think about other people that are different from yourself. People that have different values for which you try to image what a technology would mean to them is a good challenge to bring across that meaning. Because of this the world of meaning is scored 'good'. The role cards were adjusted to not only have icons as characteristics, but also a very brief description and a drawing task connected to that. This made the roles more relatable and benefitted the gameplay. Both the realism and play was therefore scored 'good' too.

Value Interpretation

New value images and value cards were introduced. The players are asked "what do you do or think because of this value". The question 'what do you do or think' is often asked when trying to figure out what the values of a person are. The interpretation picture cards are based on answers to that same question about the values in the game. For this reason reality is scored as 'good'. The participants did find it challenging to find the pictures, but they managed to do so in the end. They did say it might be harder for different values. The world of play was therefore scored as 'good' too. The world of meaning was scored 'okay'. This because the participants understood that they could choose pictures for their role's values and thus interpret the values. But did not directly express that people can interpret a value in a very different way to them.

Technology

The technology cards now have a drawing task if the technology is implemented in the city. With this task the technology is drawn on the map and its impact for the city becomes clear. The participants seemed to understand all the technology descriptions and enjoyed drawing on the map. Realism and play were scored good because of that. Because the technologies were described properly and the technology is visualized in the city, the impact of a technology on a city outside of the game was understood by the participants. The world of meaning was therefore scored as 'okay'.

Value impact on technology

The participants were able to make choices about technology during the game using the values. They were able to explain why they thought a technology had a positive effect on their values or a negative one. With the city value or goal the mayor's decisions about technology was indirectly impacted by the values too. This because the city goal is based on the citizen values. The world of play was therefore scored as 'good'. Since the values played an active part in the game, the participants remembered that after the game. So, the world of meaning was scored 'good' too. In reality the citizens would not asses technology that consciously with their values. The world of reality was therefore scored as okay.

Technology impact on values

During the test, none of the participants changed their value interpretation or the relative importance of their values. However, the test might have been too short for that. The participants did suggest that the citizens should change their values after a certain amount of in game years. This shows that they players understood that the changes made by the technology in the city over the years did impact their values. Because the meaning was understood, but it did not happen during the gameplay, the world of meaning was scored 'good' and the world of play was scored 'okay'. The reason for the world of play scoring 'okay' instead of 'mediocre' was that the players could now also keep track of the impact of the technologies on their individual values. Because the game should show the reality of changing values, but it did not happen in the test of the game, the world of reality got scored 'mediocre'.

Goal of the game

The goal of the game is in this iteration defined by the city inhabitants themselves. In particular by the mayor. They will wire down based on the collective city goal and the values for the citizens how they want to balance development and city appreciation. The city will try to reach this city development and city appreciation goal in a set amount of in game years. This is a clear and reachable goal, but it is only as challenging as the mayor makes it. This is why it was scored good for the world of play. In terms of realism the scoring of city development and city appreciation has been improved. The development is now scored in labels that is generally used for housing. The scoring also goes up to A++. Meaning that the highest score is really good, but a lower score can still be a good score. The city appreciation is scored in stars. Stars are what consumers usually use to express how much they like a certain product. This scoring fits their purpose better then numbers. That is why the world of reality is scored 'good'. The participant acting as mayor understood that the highest score is not needed and that a goal should be chosen that fitted the city. This mayor for example chose to go for an okay label, but not the best one, and a high city appreciation score. The fact that the game showed this participant that how to balance a city the right depends on the common city goal way was understood. The scoring of the world of meaning for this category was therefore set on 'excellent'.

Thesis question evaluation
The thesis question evaluation of iteration 4 can be seen in table 12.

Category	Category definition	Reality	Meaning	Play
Value dynamic impact	Is the impact of value dynamics on the smart city visible	3	3	3
Tangible value dynamics	Are the game elements helping in making value dynamics tangible	3	2	2
Engage in conversation	Do the game mechanics help the players engage in conversation about technologies and value dynamics	3	3	5

Table 12: Thesis question evaluation of iteration 4

Value dynamic impact
The value dynamics in the game are still not that present. The participants did see that the values could change over time and actually suggested that this should happen after a certain amount of time. Because of this the world of meaning is scored as 'okay'. The world of play is also scored as 'okay' since the mechanics are built in the game to enable changes in relative importance and interpretation of values. It is not yet used, however, and a more forced change as a mechanic in the game could improve this. More forced would not add to the realism of this category. Since in reality the impact is clearly visible. Currently the world of reality of this category is scored as 'okay'.

Tangible value dynamics
Currently the thing that is made very tangible in the game are the changes technology makes to the city. This is done by drawing on the map. The value dynamics are made tangible with the interpretation cards and the order in the house. There are now two different ways of value dynamics shown. And a third one is present in the game. This is the 'move' event card. When a citizen draws this they will have to take on a new role and values, changing the combined set of values of the city. In the test this card was not drawn. However, the participants enjoyed the idea of the card when they were later allowed to look all the cards. The appearance of all three value dynamics causes the world of reality the be scored as 'okay'. The word or meaning is scored as mediocre. The three different ways of value dynamics being present in the game helps in making it tangible, but it was not tangible enough for the participants to actually make changes in values happen in the game. This score will only get higher if the dynamics actually occurred in the game. Because no values changes did occur during the gameplay the world of play was scored 'mediocre'.

Engage in conversation
During the playtest the mayor actively asked the citizens after their opinions and each citizen could argue why they made their choices. Having the players take turns in suggesting technologies cause a balanced conversation throughout the whole game. The players asked questions and used their values in their argument. The world of play for this category was therefore scored as excellent. The conversations were about technologies and how the roles of the players would view them. It did not, however, make them converse about the changing of the values. Afterwards they did mention the change of values. The world of meaning was therefore scored as 'okay'. In reality the mayor would not have such direct access to the opinions of citizens and especially not have a clear view on what the value of each citizens are. However, the conversation went very naturally and no additional means were needed to keep the conversations going. The world of play was therefore scored as 'okay'.

3

FINAL CONCEPT

This chapter shows the final game design by looking at all the components of the game and describes the game through the game manual description.

3.1 Final game design

The evaluation of the last interaction guides towards the final design of the smart city game. This final game builds upon foundation of the theoretical background and was made cohesive through the three worlds of Triadic Game Design. Through the world of meaning, the purpose of the game, the thesis statement, was kept in focus. Through the world of reality, the game was connected to the real world. And through the world of play the game was made engaging and enjoyable.

This resulted in a game that makes its players understand value dynamics in the urban space by making it tangible. It describes three ways of value change relevant for the smart city. Those are; a change in the interpretation of values, a change in the relative importance of values and a change in the collection of values in the smart city through a change in the collection of people ((van de Poel, 2018) (I. van de Poel, personal communication, May 26, 2021). This is made tangible through different elements in the game. The interpretation of values is made tangible through image cards. These help the players understand that a noun describing a value can interpreted differently by people. The interpretation and the explanation thereof are an important steps in understanding the values of others (Smits et al., 2019). A change in this interpretation is embedded in the game through the mechanism of the reflection year in which the players have to reflect on how their interpretation has changed after several in game years.

A change in the relative importance of values is made tangible through the game mechanic of the citizen house layout. The value placed at the top of the house represents the most important value of the player, and this value has more effect on the rest of the game. The second value is placed underneath it and does play an important role, but not as important as the first one. The change in the relative importance can be done by physically changing the order. And thus changing the role and impact of each value. The conflict that might occur if a technology favours one value of the citizen and disfavours another was not a focus of the game. Though the conflict can be a cause for value change (de Wildt et al., 2021). However, in the game it can occur that players will judge a technology negative according to one value and positive according to the other. Different players can express according to their values what they think, resulting in a technology that is judged negatively by one player, based on their value, and positive by another player based on their value. The mayor has to decide what decision about the technology is in the best interest of the city goal that was established with the citizens at the start of the game. This value conflict is thus part of the game, however, it has not a big role in the game and does not teach smart city planners how to cope with the conflict. Learning to cope with value conflicts can be a valuable lesson, but was not the focus of the game after all. But in order to deal with value conflicts, understanding that values can change and that technology has an impact on this change can be a great start. The smart city game can be such a start for smart city planners.

The third way of value change, the change in value composition of the city, is made tangible by the personal event card. This event triggers the effects of people moving out of the city and can be seen through this action in the game. Since the players at the start of the game, guided by the mayor, have to come up with a collective city value or goal, all the values of the citizens are part of this collective value. When the role of a citizen and its values is replaced by new ones, the old collective value is not suitable anymore and needs to be reassessed. This game mechanic aids in letting the players think about and discuss the effect of value dynamics through citizens moving in and out of the city.

Another important element in helping initiators understand value change is by showing the connection between values and technology. Technologies are not neutral or univocal and are not interpreted by citizens as such (Matos-Castaño et al., 2020), (Smits et al., 2019). The interpretation of values through the lens of values is shown in the game by using plus and minus chips. They show that technology can have a positive effect on a value as well as a negative one. By letting the players discuss why they think a proposed technology will have a positive or a negative effect on their values through the chips, this not neutrality is made more tangible. The choice the mayor makes in the end will be based on the city value, and the impact of that choice on the city and the citizens can be seen in the game.

The values of citizens can change because the environment changes around them as stated by van de Poel (2018). In a smart city the technology implemented has a big impact on how the environment of a city is changed. And thus showing this change shows the connection between values and technology even more. This is combined with how the citizens interact with the environment, and other citizens in it. This change and interaction in the environment of a smart city is embedded in the game through the city map. The citizens and the mayor together shape the city. The citizens do this by drawing specific parts of the lives of their roles on the map, and the mayor by drawing in the new technologies.

This maps also aids with another purpose of the game: engaging the players in conversation. This maps acts as an sharable and identifiable object of thought (Kirsh,2010). Through using this object of thought, the players can more easily discus how the city is shaped by the technology, and how each citizen relates to that technology and the city. It shows that a smart city is a combination of different technologies and products. Conversation about the city is further encouraged by having the players take turns. Giving each citizen an active role, even though the mayor will make the final decisions. In which the mayor has an extra role of keeping the conversation going. The turns and active role of all the citizens in the game also reflect experiences in the real world with smart city initiatives. Mainly that initiatives do not only come from the government, but from citizens as well (J. van Dijk, personal communication, February 17, 2021). Though van Dijk, who is a project manager smart city of Amersfoort, mentions other stakeholders involved in initiating smart city initiatives besides the municipality and the citizens. As before, since the different sources of initiators is not the main focus of the game these other stakeholders were not added to the game. This to benefit the playability of the game over the complexity.

Another element from reality that is implemented in the game is that cities and their governing agencies do not want to work from a technology push standpoint. But rather from a need in which a technology can aid (De Koning et al., 2018) (J. van Dijk, personal communication, February 17, 2021) (*Beleidsvisie Smart City Emmen*, 2019). Preferably with input from beyond the governing agencies themselves (Mullagh et al., 2014). In the game, this can be seen in two game elements. The first one is that of the city development and city appreciation goal. What goal to reach, is not set by the game, but by the players of the game themselves. If and how much technology they want to implement in the city should come from their own drive based on their values. The second game element are the city event cards. These event cards give the technologies a purpose in a specific context. An positive event is successfully executed when the needs are fulfilled through the technologies. Likewise, a negative event can be handled with the right technology that fulfils needs for that situation.

Using Triadic Game Design for the described game elements resulted in the well-rounded game that is the smart city game. How you can play this game and what the different elements are will be explained in the rest of this chapter.
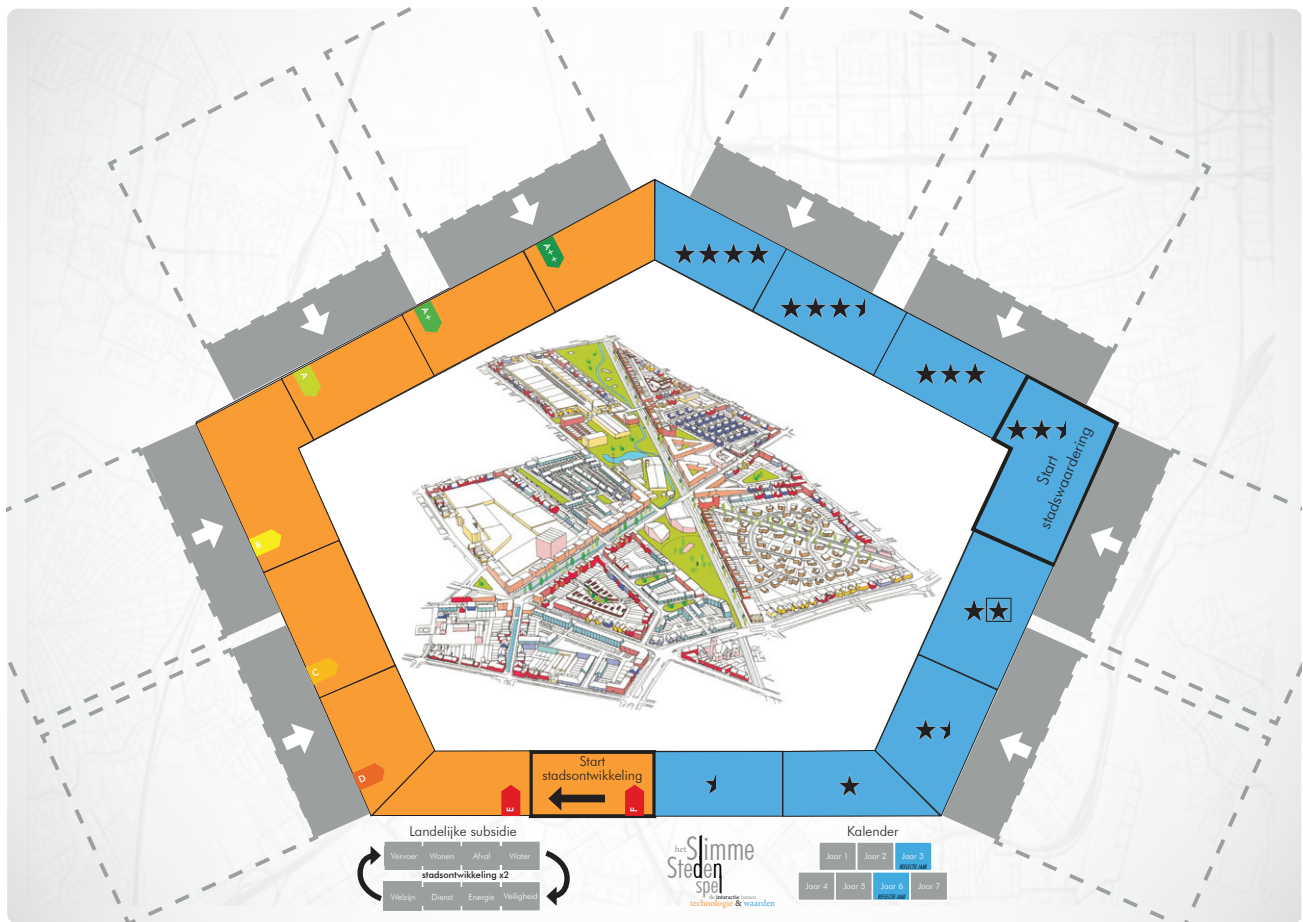
1x Board with city map

1x board with city map

The board was designed around the city map. It shows the city development progress in labels and the city appreciation in stars. Around the city are spots on which technology cards can be placed. This marks the maximum technology capacity of the city. At the bottom of the map the national subsidy tracker is shown. It displays all the categories of technologies cards. The calendar stands next to the national subsidy tracker. With it, the players can keep track of how many in game years has passed. The calendar is coated with a film so that a whiteboard marker can be used to cross out the years, but can also be erased for the next game. The map in the middle of the board is also coated with the same film. The main purpose of the map is to be drawn on by the players. It needs to be reusable and ,therefore, the drawings are erasable.

A bigger scale of the map can be found in appendix F.

GEMEENSCHAPPELIJKE WAARDE

stads-ontwikkeling

stads-waardering

Schrijf hierboven een waarde die jullie als inwoners samen delen

BURGERMEESTER

Plaats hier geslaagde stadsevenementen

Jouw taak is om de stad met zijn inwoners in goede banen te leiden zodat de stad weer bruisend wordt en de bewoners gelukkig.

1x Mayor house

Plaats hier je rolkaart

1 e

2 e

4x Citizen houses

1x Mayor House

The mayor house also has a film coat on top of the common city goal square and the city development and appreciation goal squares. The mayor can write the city goal in the first mentioned square. The orange square off to the side is used to write which label of the city development the players will attempt to reach, and the blue square underneath will be used to write down the amount of city appreciation starts the players will attempt to reach. In the middle of the mayor house there is space for any city event card that has been fulfilled.

A 1:1 scale of the mayor house can be found in appendix G.
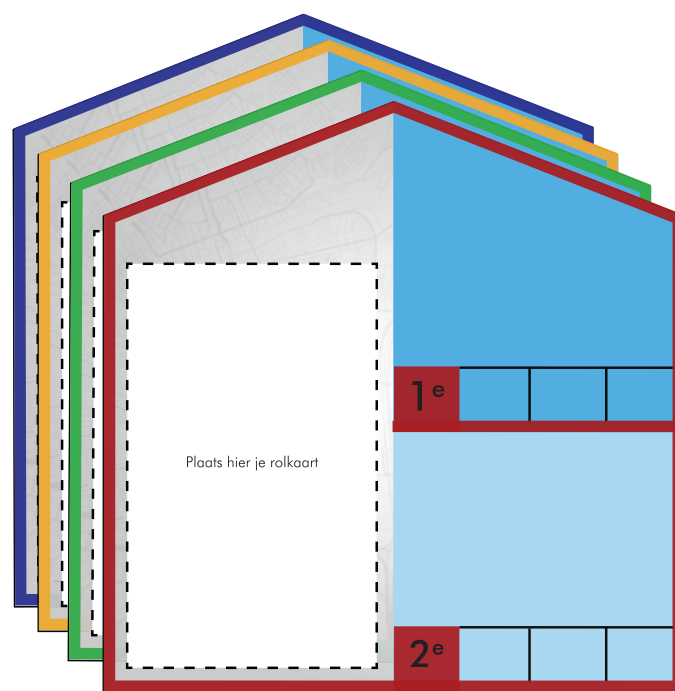
4x Citizen house

The citizen house has been designed to keep all the components of the citizens together as a cohesive set. During the game, the citizens can place their role cards on the left and their values, and value interpretation cards on the right. This way the players have a quick overview of which characteristics belong to their role. At the top right, the players can place what they consider their first value and on the bottom right they can place their second value. Underneath each value are three squares. With these the players can keep track of the plus and minus chips that resulted from the acceptance of a technology. Each citizen will attempt to live in a city that brings out the best of their values, and therefore will attempted to fill all those squares with plus chips. There are four houses in total, therefore the game supports five players: four citizens and one mayor. The houses are a different colour each to differentiate the player's items by colour.

A 1:1 scale of one citizen house can be found in appendix H.

5x Coloured markers

3x Big plus chips per colour

3x Big minus chips per kleur

3x Small plus chips per colour

3x Smal minus chips per colour
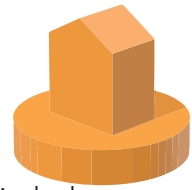
1x City development pawn
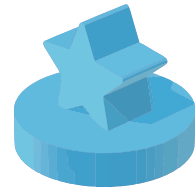
1x City appreciation pawn
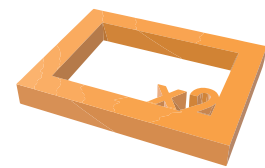
1x Subsidy marker

1x Dice

5x whiteboard markers

Throughout the game there are drawing and writing tasks for the players. In order to properly distinguish which drawing or writing belongs to whom, all the players have their own coloured whiteboard marker. The citizens have one that match their house colour, the mayor has the black one. The black marker also includes a white board marker eraser so that they can adjust their drawings and writings during the game, and can erase everything once the game is finished.

Plus and minus chips

The chips are one of the 3D printed elements in the game printed in PLA (Polyatic acid). Each citizen has chips in their own colour. One set of coloured chips consists of three big plus chips, three big minus chips, three small plus chips and three small minus chips. With this set, the citizens can give feedback on whether the proposed technology has a positive effect on their values or a negative one. The different chip sizes are to identify which chips belong to the first value and which to the second value. The small ones only count for half the score for the city appreciation compared to the big ones. When a technology is accepted the city appreciation pawn will be moved forward for every plus chip placed on it and backward for every minus chip placed on it. The small chips ,however, count only half. Two small chips are needed to move one development tile forward or backward. If the difference amounts to only one small chip, it can be neglected in the movement of the pawn.

1x City development and city appreciation pawn

The two pawns for the board were designed to match path they follow. The city appreciation pawn is shaped like a star, similar to the scoring system for the city appreciation. The city development pawn is shaped like the labels of the city development, but at the same time is shaped like a house. They are both 3D printed pieces printed in.

1x Subsidy marker and dice

The subsidy marker is also a 3D printed piece. The marker has a hole in the middle so the category is still readable while the marker is placed on it. To emphasize the purpose of the marker the bonus of the subsidy is displayed in the corner. A dice is used to move this marker at the start of every turn

Drone bezorgdienst (toekomst TECH)

Wanneer je een pakketje bestelt kan deze zeer snel bezorgd worden met drones naar jouw exacte locatie.

Hierdoor hoeven er minder bestelbusjes op de weg te rijden wat de infrastructuur van de stad verbetert. De drones zijn echter niet geluidloos en het kan vogels en ander wild verjagen.

De burgemeester geeft aan waar het distributiecentrum zit en inwoners kunnen zo de aanvlieg route van de drones bekijken.

waardering + (+ -)   + 1 stadsontwikkeling dienst

Energieverbruik-tracking (actueel TECH)

Jouw woning, en alle andere woning in de stad, worden voorzien van slimme meters die het elektriciteitsverbruik bijhouden. Het zal jou feedback geven over je verbruik en hoe je daarop kan besparen.

Voor de stad zal dit een beter inzicht geven in het totale verbruik van de stad zodat die verbeterd kan worden. De stad zal wel jou verbruik gegevens tot zijn beschikking hebben. Als geen enkele speler weigert een meter te plaatsen zal de stadsontwikkeling met 1 extra omhoog gaan.

Bij elk huis van de spelers die dat willen mag een sensor getekend worden.

waardering + (+ -)   + 1 stadsontwikkeling energie

Slimme water sensoren (toekomst TECH)

Er zullen slimme meters in watervoorzieningen en bij huishoudens geplaatst worden waarmee waterverbruik en kwaliteit kan worden bijgehouden zodat jij gewaarschuwd wordt voor verontreinigd water of overmatig water gebruik.

Wanneer er water te kort is kan de stad het watergebruik per huishouden beperken om te voorkomen dat de landbouw en de de natuur te weinig water heeft. Wanneer er een water overschot is zat dit ook beter te reguleren zijn. Als geen enkele speler weigert een meter te plaatsen zal de stadsontwikkeling met 1 extra omhoog gaan.

Bij elk huis van de spelers die willen mag een sensor getekend worden. En de burgemeester geeft aan waar waterreservoirs komen om het water overschot te reguleren.

waardering + (+ -)   + 1 of 2 stadsontwikkeling water

---

actueel

TECH

Telegeneeskunde

Wanneer je een afspraak hebt met je arts kan je dit als patiënt op afstand via een virtuele manier laten plaatsvinden. Artsen zullen vaker kiezen voor een virtuele afspraak.

Hierdoor kunnen artsen meer mensen op een dag spreken en zal de ziekenhuis capaciteit van de stad omhoog gaan. Jij hoeft niet te reizen voor een afspraak en dit scheelt dit kosten, maar hoeveel je kan overbrengen via een video gesprek is beperkt.

De burgemeester geeft aan welk gebouw het ziekenhuis is en inwoners kunnen zo zien hoe lang hun reisteit normaal gesproken was.

waardering + (+ -)   + 1 stadsontwikkeling welzijn

Deelfietsen (actueel TECH)

Bij stations en andere plekken kan je fietsen vinden die voor openbaar gebruik zijn en die je kan gebruiken om naar je bestemming te komen wanneer een bus, trein of tram je niet verder kan brengen. Dit bied een alternatief voor autorijden en kan ook het aantal bussen wat nodig is verminderen Dit helpt in het verminderen van uitstoot voor de stad en de benodigde parkeergelegenheid. Maar het maakt de stad ook verantwoordelijk voor het onderhouden van de fietsen bij schade of diefstal.

De burgemeester geeft aan waar ophaalpunten van de deelfietsen komen.

waardering + (+ -)   + 1 stadsontwikkeling vervoer

3D huizen printer (toekomst TECH)

Deze hangar kan huizen printen en daarbij informatie gebruiken over de behoeften van de huizen aansluiten op de behoeften van de woningmarkt.

Hierdoor zullen er in de stad vaker oude (niet significant historische) panden worden vernietigd in plaats van gerenoveerd, wat het stadbeeld aanpast en oudere cultuur kan laten verdwijnen. Als jij op zoek bent naar een woning is er een grotere kans dat er iets beschikbaar is wat aansluit bij jouw behoeften.

De burgemeester geeft aan waar de hangar zal komen te staan.

waardering + (+ -)   + 1 stadsontwikkeling wonen

Automatische afvalscheider (toekomst TECH)

Wanneer je afval in openbare ruimtes weggooit hoef je zelf niet na te denken over het sorteren, de slimme afvalcontainer zal namelijk zelf het afval sorteren.

Voor de stad betekent dit dat het verwerken van afval en het recyclen van materialen een stuk makkelijker zal gaan. Voor toeristen of inwoners zal het ook makkelijker gaan maar verkleint het de kennis en bewustzijn over afvalscheiding.

De burgemeester geeft aan waar deze slimme afvalcontainers komen te staan.

waardering + (+ -)   + 1 stadsontwikkeling afval

Slimme veiligheidscamera's (toekomst TECH)

Er zullen speciale veiligheids cameras in de stad geinstalleerd worden die niet alleen criminaliteit in hou buurt in beeld zal brengen, maar ook digitale activeiten zal waarnemen en deze kan koppelen aan de personen op beeld.

Dit zal de stad helpen om niet alleen straatcriminaliteit tegen te gaan, maar ook de cybercriminaliteit. Jij bent beter beveiligd tegen criminaliteit, maar de politie kan je sneller vragen gaan stellen als je verdacht gedrag vertoont.

De burgemeester geeft aan waar de slimme camera's opgehangen zullen worden.

waardering + (+ -)   + 1 stadsontwikkeling veiligheid

8x Technology cards

8x Technology cards

In this game there are eight technology cards, one for every category. There are two types of technology cards in the game: current technology and future technology. The current technology cards are based on existing smart technologies that are already in use in some cities according to McKinsey Global Institute (2018). Their description was initially based on the original technology description of McKinsey Global Institute, but during the redesign of the technology cards, the description has changed to fit the game better. The future technology cards were designed to be more surprising for the players and to bring some speculative technology into the game. During the design of these future technology cards, several participants were asked to join a brainstorm activity. In this activity, participants had to come up with technology from the future. The outputs of that brainstorm activity was used to come up with technology of the future. The description on each technology card is written from the perspective of a citizen and is made more personal by listing some of the advantages and disadvantages of the technology for the city and the individual. Each card also describes a drawing task. This is a task the mayor needs to perform after accepting the technology into the city. The categories for the technologies were added to differentiate the technologies from each other. Combined with the city events and the national subsidy bonus, each technology has its own role.

All technology cards can be found in appendix I.

STADSGEBEURTENIS

Jullie stad organiseert in de winter een speciale wintermarkt waar veel toeristen verwacht worden. Dit levert stadsontwikkeling op wanneer jullie een vervoer technologie en een afval technologie in de stad hebben.

Indien vervoer en afval in de stad aanwezig zijn

+ 2 punten

STADSGEBEURTENIS

Er is een migratiegolf naar de stad en daardoor zijn meer woningen en werkgelegenheid nodig. Ook zal dit energie kosten. De stadswaardering daalt tenzij je een wonen en een energie technologie in de stad hebt.

Tenzij energie en wonen in de stad aanwezig zijn

-2 punten

STADSGEBEURTENIS

Een besmettelijk griepvirus raast door het land en is ook in jullie stad aangekomen. De stadswaardering daalt tenzij jullie een welzijn en een water technologie in de stad hebben.

Tenzij welzijn en water in de stad aanwezig zijn

-2 punten

STADSGEBEURTENIS

Een groot Europees evenement komt naar jullie stad. Dit levert stadsontwikkeling op wanneer jullie een dienst technologie en een vervoer technologie in de stad hebben

Indien dienst en veiligheid in de stad aanwezig zijn

+ 2 punten

4x City event cards

Je besluit de stad te verlaten en in jou plaats komt er iemand anders in de stad wonen.

PERSOONLIJKE GEBEURTENIS

Leg je rolkaart en waarden af en neem een nieuwe rol aan

Indien de burgermeester deze kaart trekt: leg de kaart dicht weer terug

1x Personal event card

5x event cards

The event cards were introduced in the game to give the different technologies cards more purpose. This purpose favours working from a need in which a technology can aid, and is not technology push driven. The city events play that part specifically in the game. There are four city event cards in total in the game, and for each event card two technology cards from different categories are needed. What 'needed' means in this context is that a bonus can be added, or a handicap removed, when the right technologies are implemented in the city. All the categories are needed once to fulfil all city event, since there are four event cards and two technologies are needed for each event. There are two city event cards that have a possible bonus for the city development, and two city event cards that have given a handicap to the city appreciation and can be removed with the right technologies. There is one other special event card in the game. This is a personal event card rather than a city event card. During the design phase of the game there had been more event cards, but they made the game more complicated then was needed, therefore those event cards were removed. However, this one personal event card touches upon an important aspect of value change in the city. This is the moving of one citizen out of the city, and the moving of a new person into the city. New people will bring new values and thus affects the combined values of the citizens and the common city goal. The personal event card will cause the player who draws it to discard all their value cards and role cards, and start again with a different role and different values.

All event cards can be found in appendix J.

Buschauffeur — 55+

Omdat je toe was aan een nieuwe uitdaging ben je nu met plezier als buschauffeur aan het werk na eerst iets anders te hebben gedaan.

Geef aan waar je woont en welke busroute je rijdt

Waargenomen gezondheid | Huis samenstelling | Digitale kennis | Opleidings niveau

8x Role cards

55+ — Chirurg
Je hebt al vele jaren ervaring als chirurg, woont alleen en hebt veel kennis over technologie.

Geef aan waar je woont en waar het ziekenhuis is

Waargenomen gezondheid | Huis samenstelling | Digitale kennis | Opleidings niveau

Volwassene — Cyber Security Specialist
Je werkt als cyber security specialst en woont samen met je partner.

Geef aan waar je woont en waar je kantoor is

Waargenomen gezondheid | Huis samenstelling | Digitale kennis | Opleidings niveau

Gepensioneerd — Filosofie Docent
Je hebt eigenlijk al gepensioneerd, maar blijft toch nog even werken als filosofie docent. Je hebt regelmatig last van je longen en woont samen met je partner.

Geef aan waar je woont en waar de school staat

Waargenomen gezondheid | Huis samenstelling | Digitale kennis | Opleidings niveau

Volwassene — Horeca-assistent
Met een gemiddelde opleiding heb je al een aantal jaren ervaring met het werken in hetzelfde restaurant. Je hebt een chronishe aandoening, maar met de juiste mediceinen heb je het meestal onder controle.

Geef aan waar je woont en waar het restaurant staat

Waargenomen gezondheid | Huis samenstelling | Digitale kennis | Opleidings niveau

Jongvolwassene — Partymanager
Na het afronden van je opleiding ben je voor jezelf begonnen als partymanager. Het is af en toe stresvol, maar het lijkt goed te lopen.

Geef aan waar je woont

Waargenomen gezondheid | Huis samenstelling | Digitale kennis | Opleidings niveau

Jongere — Verpleegkundige
Je woont nog bij je ouders, maar doet een opleiding tot verpleegkundige waarvoor je een klein eindje moet reizen.

Geef aan waar je woont en waar het station is

Waargenomen gezondheid | Huis samenstelling | Digitale kennis | Opleidings niveau

Jongvolwassene — Medewerker Tankstation
Je bent nog bezig met het afronden van je opleiding, maar werkt bij een tankstation om geld bij te verdienen.

Geef aan waar je woont en waar het tankstation is

Waargenomen gezondheid | Huis samenstelling | Digitale kennis | Opleidings niveau

8x Role cards

There are eight role cards in this game. The role cards are based on statistics of the Dutch population over the period of 2019 and 2020. Specifically the statistics of digital skill, education level, age, household and perceived health of humans. The distribution and percentages of these characteristics over the Dutch population was calculated and applied to a total of eight roles. The statistics of the profession sectors were also taken into account and, combined with the education level, suitable jobs were given based on these two combined statistics. During the redesign of these role cards some aspects were slightly adjusted to fit the gameplay better. Each role was given an extra textual description about their lives added to their statistics.

All role cards can be found in appendix K.

PRESTATIE

Wat doe of denk je vanwege
deze waarde?

Plaats je afbeelding hier

21x Value card

67x Value image card

21x value cards and 65x value image cards

The value cards in this game are based on a selection of a list of commonly used values. The list originally consisted of 25 values and was reduced to 21 for this game. This number was chosen the values were used in three different questionnaires. The questionnaires were made in order to create suitable value interpretation cards and instead of sending out one big questionnaire, three of different lengths were sent out to participants. One that asked questions about five values, one about seven values and one about nine values, thus coming to a total of 21 values. These different lengths were chosen because the questionnaires had a slight gamificated aspect. In my own experience, questionnaires can be long and tedious to fill out and during my studies I have come across many questionnaire requests that I chose to ignore. To encourage people to participate in the questionnaire, and since this project is about games and gamification anyway, the three different questionnaires were made. Because this questionnaire was sent out while the Olympics were going on, the

people participating in the shortest questionnaire gained a virtual bronze medal, the once participating in the longest questionnaire a gold one and the questionnaire in between a silver one. Possible participants that had more time than others were encouraged to go for gold, while people who did not have a lot of time could squeeze a short bronze earning questionnaire in their schedules. Reactions to this way of asking to participate were positive, which seemed to result in more engaged participants when looking through the answers to the questions. The answers themselves were used for the value interpretation images. The participants were asked to describe what they would do because of a certain value. This question is often used to help people clarify what their values are. The action shows what a value means to a person and how they let it affect their behaviour. The actions mentioned in the answers of the questionnaires were used to find suitable images and this resulted in the 67 value interpretation images.

All value cards can be found in appendix L, and all interpretation cards can be found in appendix M.

Stadsvoorbereiding — FASE 1

- Schud de gebeurteniskaarten
- Leg de bovenste open op een vak op het bord
- Schud de rest van de gebeurteniskaarten met de technologie kaarten
- Leg de 7 bovenste kaarten van die stapel dicht op de overgebleven vakken
- Teken op de kaart waar jij als burgemeester woont

Stadsdoel

- Vraag de burgers hun rol en waarden voor te stellen
- Bepaald met de burgers wat een gemeenschappelijke stadswaarde is
- Bepaald het stadsontwikkeling doel en het stadswaardering doel
- Schrijf dit allemaal op het burgemeesterhuis in de goede vakken

BURGERMEESTER

1x Mayor cheat sheet
front

Start beurt — FASE 2

- Gooi dobbelsteen voor landelijke subsidie
- Kies kaart rond de stad en bekijk kaart

Stel wel voor	Stel niet voor	Gebeurtenis
Leg uit waarom	Leg dicht terug	Leg open terug
Streep jaar af	Beurt afgelopen	
Burgers plaatsen fiches		
Ondervraag burgers		

NEEM HIER OVER VAN BURGER

Aannemen	Afwijzen
Verplaats stadswaardering pion	Leg technologie op aflegstapel
Verplaats stadsontwikkeling pion	Leg een nieuwe kaart gesloten op lege vakje
Voer tekenopdracht uit	
Burgers pakken fiches terug	
Schuif technologie naar stad	

Beurt afgelopen

Mayor cheat sheet
back

Burgerschap — FASE 1

- Trek een rolkaart en twee waarden
- Zoek voor elke waarde een afbeelding
- Voer de tekenopdracht uit

BURGER

4x Citizen cheat sheet
front

Start beurt — FASE 2

- Gooi dobbelsteen voor landelijke subsidie
- Kies kaart rond de stad en bekijk kaart

Stel wel voor	Stel niet voor	Gebeurtenis
Leg uit waarom	Leg dicht terug	Leg open terug
Streep jaar af	Beurt afgelopen	
Burgers plaatsen fiches		
Burgermeester neemt over		

ALLE BURGERS

Afgewezen	Aangenomen
Neem fiches terug	Plaats fiches onder juiste waarde

Beurt afgelopen

Citizen cheat sheet
back

4x citizen cheat sheet & 1x mayor cheat sheet

The game manual describes what actions a player can do during their turn at what phase of the game. But it can be tedious to have to refer to the manual each time a player starts a turn. Most games have little cards that give a short summery of the steps that need to be followed in a turn. This game also has such cards. They are called 'cheat sheets' and lists the steps the players need to follow in order to play the game. There are two different kinds of cheat sheets: one for the mayor and one for the citizens. The front of the cheat sheet shows what needs to be done in phase one of the game, the back shows phase two. The different choices of what a player can do during the city development phase are displayed too and can be used as a flowchart.

The front and back of the cheat sheets in 1:1 scale can be found in appendix N.

The chapter explains how the smart city game works. This will be done in a similar style as most games described: as a manual. The actual Dutch manual of the game, on which this description is based, can be found in appendix O.

Introduction

A new mayor, diverse citizens and a city in need of renewal. This is the situation of the game you are about the play. The renewal will come through different smart technologies. These will have advantages for the city and aid the city in its development, in which it so far has stayed behind. But what do the citizens want? They each have their own values that affect what they do and think. Also what they think about the smart technology opportunities. The technology again will affect what the citizens will do within the city. Does the new technology contribute positively to the value? Or does it clash with the value? Maybe the value will change because of new insights that comes with the technology. And what benefits the city? One does not have to oppose the other, but it can be a challenge to find the balance between the development of the city and taking the values of the citizens into account. This challenge is what this game is all about

Cities are presented with so called improvements for their city in the shape of smart technology. When a municipality considers implementing those in their city, it is important to take the values of their citizens into account. Not only because the citizens shape the city, but because the they will shape the technology, as well as the technology shapes them. And sometimes differently than you think. This game was designed to engage into a conversation about the impact of technology on values in the city. It does this by letting you play as a character that might think differently than you would do.

Role division

Give the player that always asks the right question the mayor house and the other players the citizen houses. Shuffle the role cards and value cards. Place the board with the city map on the table.

Phase 1: Preparation

Citizenship

Each citizens draws 1 role card and 2 value cards. These are placed in their respective citizen houses.

Each citizen in the city has their own values, and interpret those values each in their own way. To represent this interpretation each citizen can choose a picture for each of their values. This picture represents what you do or think because of that value and how you, as your role in the game, give shape to the value.

Which value do you think your role considers most important at this time? Place this one at the top of your house and the other one at the bottom.

On each role card a drawing task for the city map is mentioned. Let every player execute this task, each with their own colour marker.

City preparation

The mayor shuffles the event cards. One of the event cards he will place open on one of the spots on the board. If it is not a city event cards but the personal event cards, another event card needs to be placed on the spot. The personal event card can be placed back again in the stack of event cards.

Shuffle the remaining event cards together with the technology cards until you have one stack left. Take the first seven cards and divide them over the board as can be seen in the image above.

The mayor draws where they live on the city with the black marker.

City goal
Now it time for the mayor to their part. Their task is to observe the city as a whole and to watch the different citizens. The mayor will now ask each citizen to introduce their and values to the rest of the city.

Common value
Discuss as mayor with the citizens what a common value is for the city that everyone can support. Take each citizen's value into consideration before deciding. Once a common city value is chosen write it on the designated spot on the mayor house.

City development and city appreciation goal
Choose what you want to achieve in the end in terms of city appreciation and city development. How many stars and what label do you want to have achieved at the end of the game? Write this down on the coloured spots on the mayor house.

Phase 2: City development

Start turn
Start your turn as citizen or mayor with throwing the dice. The decides what a possible national subsidy will be in case a technology is proposed. This subsidy means that a technology from that category will be worth twice as much city development points.

Next you can choose one of the technology cards around the city.

If it is a city event, lay it open on the table.

Technology proposal
Propose technology
If it is a technology card: read the description and see if it matches your values. As citizen see if fits with your own values. As mayor see if it fits with the city value. If it doesn't, place it closed again on the spot where it came from. If it does, show it to the other players and explain why you think it is good for yourself and for the city.

Now a technology is proposed, the city will spent a year on discussing if whether to implement it or not. Cross off one year of the calendar.

Give feedback on technology
Each citizen now looks for themselves if they think the technology fits with their values. Does the technology help in acting according to a value? If yes, place a + chip on the proposed technology card. Does the technology clash with your value or does it have a negative effect on acting out your value? If yes, place a – chip on the technology. For your 1st value a big chip, for your 2nd one a small chip.

Do you really feel neutral towards the technology, then you are not obligated to place a chip, but do try to think again what influence the technology can have on your values.

The mayor will continue their turn, or takes the turn over from a citizen. They will ask the citizens to explain why they placed which chip. They mayor and the citizens are allowed to ask multiple clarifying questions.

Reject or accept
The mayor has the last say in this. They will summarise shortly the pro and cons and adds their own opinion. How does the value contribute to the common city value and goal? They can ask the citizens extra question and give them a change to change their chip placement.

Reject
When the mayor chooses to reject the technology they will place the technology card at the bottom of the technology stack and takes one from the top to place it closed on the empty spot on the board. The citizens will take their chips back and the turn is to the next player.

Accept
When the mayor decides to accept the proposal they move the city development pawn across the board corresponding the amount that the technology provides. The city appreciation pawn can also be moved, one place further for each big + chip, one place back for each big – chip. For each 2 small +/- chips the pawn can also be move one place ahead or back. Each citizen takes their own

chips back and places them on the fitting spots underneath the right value.

The technology card remains placed open on the spot where it came from, but can now be moved over the grey square towards the city.

The mayor executes the drawing task mentioned on the card. This marks the end of the turn and the next player can start their turn.

Chips in the citizen houses

When all the spots for the chips underneath a value are full, a − chip and a + chip can cancel each other out. They can then be removed to make room for new chips.

Events

When an event card is turned over, it will remain open on its spot on the board. When points can be earned from the event, they can only be collected when the right technology cards are accepted in the city. When points are lost due to an event, this takes effect immediately by moving the pawn. This can only be reversed when the right technologies are in the city. The turn of the player who turned over the event card will also end and the next player can start their turn.

The event card will remain on the board until the conditions are met, when that happens the mayor can place the card on his mayor house

and they can put a new card from the stack on the now empty spot on the board.

Special events

Citizens can move away to other cities and can also move towards your city. The event move is a special event card that applies to the person who turned the card over, if the player is a citizen. When that happens the citizen puts away their values and role and takes new ones. New values will be added to the city as a whole this way and, therefore, it is advised to the mayor to reassess the city value and goal and change that if necessary.

Reflection year

Each third year in the game is a reflection year. Citizens change over the years, and their values can change too, especially when the city around them changes. Each citizen will therefore look for a new image for each of their values. This can be similar images if the interpretation of their values has not changed. But it can also happen that the interpretation or execution of the values has changed completely. Find a fitting new image in that case. Look also on which value you want to focus the coming three years in the game. Do you consider your 1st value still to be the most important? Or do you want something in the city to change according to your second value. You can change the value with accompanying chips if you like.

The mayor will consider whether the city value is still appropriate after the changes of the citizens.

End of the game

City goal

The game ends when all the years on the calendar have passed, or when all the building spots in the city have been filled. How many years are played, can be discussed between the players before the start of the game. The minimal amount of years to be played is three.

When the game ends, the mayor checks whether the city goal has been reach. First they look at the city development and city appreciation. Have you reach the goal you set for yourselves at the beginning? If you have, you have won the game! Then take a look at the predefined city value. Do the technologies implemented in the city support it?

Citizen goal

Each individual citizen has a personal goal to fill the spots underneath their values with only + chips. When you succeed to do this as a citizen for both your values you have found the perfect place to live within this city and you have personally won the game too.

Did you not reach your city or personal goal? Try to find out why. Is there something you could have done differently?

This chapter reflects on the thesis by looking at the three thesis questions

This chapter will conclude the thesis statement based on the three sub questions. These three sub questions are: (1) What is the impact of value dynamics on the smart city, (2) what game elements and dynamics work best in making value dynamics tangible in a serious game, and finally (3) what game elements will help smart city planners engage in a conversation about the impact of value dynamics in the urban sphere. The chapter ends with an overall conclusion.

What is the impact of value dynamics on the smart city
Literature on value dynamics and smart cities showed that there are different aspects that explain what the impact of value dynamics on the smart city are. First of all, values appear to not be static. They can change over time. However, this time can be very long. In product design, there are several methods that take the values of people into account like Value sensitive Design (Friedman et al., 2017). They do not, however, take the changing of values into account as much since the lifetime of products is not always long enough for value change to occur. Though value change is more than a complete change in a person's value. As the value change taxonomy (van de Poel, 2018) learns that there are also subtler ways values can change. These subtler changes can be caused by technology and the Values that Matter (Smits et al., 2019) method tries to take these value changes into account in their product design. They do this by acknowledging that technologies are not neutral and anticipating how the values of people will change due to new interaction with, and through, the technologies. Through expert interviews I discussed how literature

about taking value change into account for product design can be translated to taking values into account for a smart city. Therein I conclude that for smart cities three main ways of value change were most relevant for conveying value dynamics in smart cities through a game. Those are: a change in the relative importance of values, a change in the interpretation of values and a changing in the collection of values within the city due to inhabitants moving in and out of the city.

These ways values change in the smart city cannot be seen directly. However, citizens in a city will evaluate the technology based on their values. The impact of the technologies on the values is what can cause value change to occur. And what for effect these technologies have can be anticipated by looking at what the positive effects of a new technology are on a value, and at what the negative effects are. These effects can trigger the different ways of value change. When the values of the citizens change in the city, the technology that was implemented while taking the 'old' values into account might no longer fit the changed values. All while the technology itself was the cause of the value change in the first place. Values and the technologies in the city impact each other through their interaction witch each other and citizens. The impact of value dynamics on the smart city is that the values impact the reaction to and choices of new technologies by citizens and city planners, while these new technologies effect the values. How citizens perceive the city will be shaped by the new technologies through the value dynamics.

What game elements and dynamics work best in making value dynamics tangible

To make the information found about value dynamics tangible, the theoretical framework was broadened with literature research on game design. A distinction was found between gamificated tools and serious games. I concluded that either a gamificatated tool or a game both have their benefits of conveying a message over traditional learning methods. The most important benefit for this thesis was that games and gamification engaged participants better when compared to using traditional methods. I choose to focus on a serious game rather than gamification since it would bring a novel approach to the field of value change in smart cities. Though most literature on serious games uses examples of digital games, for this project the choice was made to develop an analogue game. I made this choice based on the advantages it has for multiple people to make sense of difficult subject together. This sensemaking of the world together through touchable and tangible objects has benefits over a sensemaking through virtual means only, as was in the theory of embodied interaction (van Dijk & Hummels, 2017).

These insights concluded the theoretical framework chapter and its insights were used in the design chapter to create a game scenario. This scenario combined ideas of how value dynamics can be made tangible and developed them into game elements. This scenario formed the start of the iterative design process. One iteration consisted of prototyping, testing, evaluating and redesign. Each iteration was evaluated based on the theory about Triadic Game Design (Harteveld, 2011). This theory describes that to develop a well-balanced serious game, three different worlds need to be taken into account: the world of reality, the world of meaning and the world of play. In order to make sure the world of reality was present in the game, I interviewed a context expert to get insights in how smart city initiatives arise and how smart cities cope with values in their cities. In each evaluation, different categories were scored on how well they embodied all three worlds. To get to the final design, I completed four iterative cycles of which two were tested with external participants and two were tested by me individually. Throughout the prototyping and redesign two other activities were done with external participants. One was a brainstorm activity on speculative future technology and one was a questionnaire about the interpretation of values.

There are several elements used int the final game that proved to be helpful in making value dynamics tangible. The five elements that proved to be most helpful in conveying value change were (1) letting the players take on the role of a citizens or the mayor, (2) using images to show the interpretation of values, (3) letting the players place their values in order of importance, (4) having a 'reflection year' in which the players are forced to re-evaluate their values in terms of interpretation and order of importance, and (5) having a 'move event card' that causes a player to discard their role and values and take on new ones. These five game elements show the three different ways values can change in a smart city. But other elements were needed to create an engaging game. One of those element was the placing of the positive and negative chips on new technologies based on the citizen's values. This showed the relation between values and technologies and helped in making this tangible for the players. Another mechanic found to be a good game mechanic was a map of the city that can be manipulated. This mechanic brought the game elements together by showing it in the context of the city. Moreover, it shows that a smart city is a conjunction of multiple smart technologies embed in an urban sphere. Since all the players need to manipulate the city map, it show the players the involvement all citizens in decisions about technology and the effect of value dynamics.

I can conclude that value dynamics can be made more tangible through the use of the aforementioned game elements. However, the game shows the static aspects involved in value change more than the dynamic ones. Participants of the game cannot show with any of the mechanics how value dynamics and technologies impact their daily lives and interactions of their roles. Only the information on the technology cards gives them an idea of what might change. I, therefore, conclude that some aspects of value dynamics were made tangible for players through the game. But the dynamics of values are not made as tangible as desired through the use of these game elements.

What game elements will help smart city planners engage in a conversation about the impact of smart technologies on changing values and vice versa

The final game was not tested yet specifically with smart city planners. Therefore, I cannot make any conclusions in what them would specifically help. However, during the fourth iteration, the game was tested with regular participants. During the playtest they were able to engage in a conversation. There were 5 elements that helped them do this. First of all (1) they were all given an active role in the game. Each player had a turn in which they could propose changes to the city and during their turn, the other players had to be active too. Another element that encouraged conversation was (2) the role of the mayor. They overviewed the city as a whole and could reflect on the impact of a technology on the whole city rather than on just one citizen. From this position, the mayor could ask the citizens after their opinions about technologies and motives for evaluating the technologies negative or positive. Discussing this helped the citizens reflect on their decisions. The visuals (3) in the game also

aided the conversation. By pointing at the map, the role cards or the value cards, the players could ask each other questions about their roles, values and their choices. The map (4) had an extra functionality in the conversations. When a new technology was introduced, the mayor could explain how the technology would be implemented through drawing on the map. The last game element that helped regular players to engage in a conversation was (5) the challenge of thinking as someone else. Through taking on a role and being given random values, the players were challenged to think what a technology would mean to the values of others. By explaining their role and values to the other players, they could discuss if and why it is challenging to them to act as that specific role with those specific values. However, as I mentioned, these participants were not smart city planners. There is no real reason why these elements would not support smart cityplanners to engage in a conversation too. However, until the game is tested with that specific group, I cannot conclude that those elements hold true for intended participants as well as for regular participants.

Overall conclusion

I can conclude that through this thesis a workable game was designed. The literature and the expert interviews were valuable in understanding value dynamics in the smart cities in order to design the smart city game. Using the Triadic Game Design and an iterative design process, the worlds of reality, meaning and play were balanced. This meant that throughout the design of the game the reality of value

change was kept into consideration, as well as the meaning of letting players engage in a conversation about the impact of value dynamics on smart cities. Balancing the worlds meant that sometimes some aspects were designed to be less realistic in order to convey the meaning and purpose of the game better, for example, by displaying the values of the citizens. In reality, the values people have are not immediately visible to others. Displaying the cards made it easier for players to reflect on and discuss theirs, and each other's, values. So in this case meaning and play were more important than reality. to By taking the world of play into account it was made sure that the game itself resulted in an understandable, playable and fun game. I can conclude that using these worlds throughout the design process proved to be useful for achieving an engaging serious game. The game helps players to become aware of value change and engage in a con versation about it with each other through the designed game elements.

Unfortunately, the value dynamics in the game are still a bit static. I can say that it is present in the game and the players can learn about value changes through the game, but it needs improvement to make value change truly tangible. The game needs testing still with smart city planners to conclude whether the game helps them specifically in making value change tangible and engaging in a conversation about it. But so far, using a serious game as a tool does help in making an ethical discussion engaging and entertaining.

This chapter is sperated into two parts: the first will discuss the final results of the game and gives some recommandations on further development of the game. The second part will discuss the contrbution of this thesis as a whole.

5.1 The smart city game reflections

The game can be considered as finished, but the thesis statement is not completely answered. This lies mostly in the evaluation and testing of the game with the intended audience. This chapter will discuss the limitations of this research by looking at the evaluation of the game first. It will then discuss some minor other limitations and proceeds in discussing recommendations for further development of the game. It is then followed by an explanation of what this thesis can contribute to the ethical reflection of values in urban spheres and the use of an analogue serious game as a reflection tool.

Evaluation discussion
The evaluations of the game were done by observing participants while they played the game and afterwards were shortly asked as a group how they experienced certain aspects of the game. To properly evaluate if the players learned new things about value dynamics in smart cities, they should be asked questions at a later time. Maybe a week later the participants could have been asked what their thoughts were about values, value interpretation, value change and the connection between values and technology. By asking the participants at a later time, I could evaluate if the game had a lasting effect on their perception about value dynamics in the urban sphere.

Regarding the evaluation with participants, the participants were asked to give feedback after playing the game as a group. Individuals were asked how they experienced the game in a group setting. To get a less biased answer from each participants they could have been asked to give feedback individually without the other participants around.

The focus of the game design has now been on representing value dynamics in a smart city setting in a playable game. The connection of technology and values is shown in this too. Moreover, it shows how a city can chose themselves how they want to balance the city development and city appreciation. Showing all this in a game that was also fun to play was a challenge already. As is usually done in product design, the preference of the target audience plays a big part in the design choices. For this game design, the setting of the target audience, smart city planners, was taken into account, but not specifically the likes and dislikes of that target audience. What do smart city planners enjoy playing in terms of board games? When is a game too complicated for them? These are questions that have not been answered in this research.

Minor other points of discussion.
A small point of discussion of less importance in the design of the game is the chip placement. Now the chips that citizens place underneath their values are only those of implemented technologies. However, if a citizen proposes a technology and it is rejected by the mayor, this will also have effect on how they appreciated the city. This is currently not in the game.

Important for the development of the game
The game has been designed, it is functional, but it still needs some extra work. To really know how the game can be used for smart city planners to engage in a conversation about values, value dynamics and smart technology, it needs to be tested with those people. The results will give insights in what can be adjusted to show improve the game and fit the smart city planners

Some aspects of the smart city game have not been tested yet. These can also be tested and evaluated with

the target audience test. The most important thing to evaluate is the new reflection year game mechanic. This mechanic was partly suggested by participants of the test of iteration four. The suggestion promises that players understand that a value can change because of changes to the city, but does not prove anything. In a new playtest with the target audience the experience of this reflection year as a way to show the changing of values of people can be evaluated and its use to show value dynamics can be validated.

Further development of the game.
Once the most important things have been adjusted to fit the target audience, there are other ways the game can be improved to make it more relevant for the smart city planners to play. One small thing is that each group of players could order, or even print themselves, a map of their own city. This map would replace the map in the middle of the board. This way the game becomes more interesting since the players will recognize important landmarks. The discussions the players would be having during the game would then be more relevant for their real life situations and helps them think not only of technology and values in relation to a city in general, but specifically to their own city.

Another way the city can be made more relevant for smart city planners to play, and possibly more interesting, is to let the role cards be based on real citizens of their cities. This could be done by setting up an online platform for citizens. On this platform, the citizens could recreate themselves in the form of a role card. By filling in their name and characteristics they can be made as a role card for the game. The smart city planners can then print out a random selection of those custom made role cards. The citizens will be

more involved in the development of their city and the smart city planner players will have more reason to try and image how the city is experienced through the perspectives of their roles.

A different approach to make the game more interesting is to create specific challenges. An example of such a challenge can be: "The city has been working very hard on developing a good technological city, but it left its citizens very unhappy. The city development pawn starts at label C and the city appreciation pawn starts at one star. Try to balance the city development and appreciation better by listening to the citizens". Another example can be: "Citizens are generally very happy in your city, but the province has decided to invest more in developed cities that have reached label B in four years. If you don't manage that you will lose significant investments and are forced to close down part of the city and citizens will have to move. Start at lowest label for city development and start at four stars for the city appreciation." These challenge scenarios will make the game more interesting for players especially when they face a similar situation. However, the focus will be less on changing values and more on these challenges. The scenarios can add other ethical questions and the game would still be a useful tool for supporting ethical reflection that incorporates value dynamism. Research would have to be done on current dilemmas in cities that face these kind of challenges in real life. Adjusting those real life dilemmas to fit the game can make the game more challenging then it currently is, but still relevant for real life situations on urban spheres. It would, however, take away the unique aspect that the players can set their own goals. How players deal with an outside push can still invoke interesting conversations

5.2 Thesis contribution

This thesis explored how an analogue serious game can be used as a tool to let smart city planners become aware of and reflect on the impact of value dynamics in the urban space. This will help the smart city planners reflect on how they want to shape the future of their smart city project and smart cities by taking value dynamics into account. Once they are aware of the impact of their project on the values of their citizens and how the changing values of citizens impacts the future of their project, they can re-evaluate their project.

The importance of values has been present in the ethical discussion of product design as can be seen in Value sensitive Design (Friedman et al., 2017). A rise in the recognition of the dynamic nature of values can be seen too in the work of Kudina (2019)

and for products in the work of van de Poel (2018) and in the Values that Matter method (Smits et al., 2019). Cities are confronted with ethical discussions and Jørgensen & Vrangbæk claim that values play an important role in this ethical discussion (2011). This thesis contributes a bridge between the two worlds of designing for value dynamics in products and smart city development. The thesis strived to find out how the value dynamics as described by, among others, van de Poel (2018) and Smits et al. (2019) used in the ethics for product design can be applied to the field of smart cities. It is this contribution of what is known about value dynamics in products applied to smart cities that makes this thesis valuable for the field of ethics in smart cities. The research that this thesis has done expands the knowledge of value dynamics in smart cities, but would be more rich if others would research

this translation from value dynamics in product design to smart city development too.

The focus of this thesis has been on making smart city planners aware of and reflect on the impact of value dynamics. The smart city game will not aid them in how they can adapt their project to take the changing values into account. It does not guide them how to confront value conflicts as described by de Wildt et al. (2021). This is a step the initiators have to figure out themselves. Van de Poel has described how to design for products while taking value dynamics into account (2018). This however, talks about products and not about smart cities. Looking at value conflicts in smart cities through participatory design activities have been described by Matos-Castaño & Geenen in their annual report on the designing for controversies project (2019). But this thesis can add to that research and serve as a foundation for further research on how knowledge and methods on how to design for value change can be used for the implementation and development of a smart city project.

The game designed currently lets its players specifically reflect on the impact of values on technology choices, and the impact of technology on value changes in a smart city setting. But this game serves as an example that a game can be a valuable tool to give shape to an ethical discussion. The game is designed as a stand-alone game that does not need an external party to organize an ethical debate. A group that is concerned with the impact of technology beyond the function of the technology can decide to play the game in their own time. A game also encourages all participants to participate in the discussion because each player has an active role. This is beneficial for any discussion, while in traditional conversation people can decide to remain silent and let the talkative people talk. The smart city game shows the usefulness of a game in any debate where groups of people are encountering difficulties with engaging in and reflecting on ethical discussions.

For the field of serious games this thesis can also contribute. Most of the literature on serious games and designing for them focusses on digital games. While digital games in themselves have benefits (Deterding et al., 2011) (Cavada & Rogers, 2020) (Hamari et al., 2014) the advantages of a tangible game is sometimes neglected. The entertaining value of games aids in making an activity more engaging and this is often mentioned in in research on serious games (Blumberg et al., 2012), but engagement through embodied interaction is overlooked in research on serious games. This engagement through embodied interaction uses more than screens, mouses and keyboards to let people engage in an activity (van Dijk & Hummels, 2017). And as opposed to digital games, a physical game can encourage face to face interaction between different people playing the game. Through a sharable and identifiable object of thought (Kirsh,2010) players of a game can work together in improving their understanding of a subject. An external representation of the smart city game is the city map that the players can all manipulate together. A serious game of which the purpose is to let people understand a certain subject better, or let them think about a subject differently together, can benefit from using an analogue game instead of a digital game. The smart city game can be an example for others that want to use games as a medium to convey a purpose beyond entertaining to consider analogue games as an option beside digital games. If other fields concerned with conveying a message beyond entertainment will study the effects of a serious board game rather than a digital game, the results can be compared and the benefits of using such a tool can come to light.

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APPENDIX

The following appendices can be found over the next pages:

Informatie over smart city projecten verzameld van gemeenten internet:

Hans Nouwens

Programma directeur Nationaal Smart City Living Lab Connected Worlds

Gelijk met de introductie van de smaprthone is Hans betrokken geraakt bij de ontwikkeling die later Smart Cities is gaan heten. Hij is de producer geweest van de Smart City serie op RTL7 en SBS6, de initiator van de verkiezing voor de Slimste Binnenstad van Nederland, de programmadirecteur van het Nationaal Smart City Living Lab, hij ondersteunt gemeentes bij de digitaliseringen heeft diverse onderzoeken gedaan naar de opschaling van smart city iniatieven voor de ministeries BZK en IenW.

Als ex-voorzitter van Making Sense 4 Society en voorzitter van Smart Lighting bij Openbare Verlichting Nederland ziet hij veel smart city initiatieven. Hij maakt zich zorgen over de cyber weerbaarheid en de ethische kant van datageneratie in de openbare ruimte. En hij filosofeert over smart cities als redding van onze democratie.

https://slimmestad.vastgoedmarkt.nl/sprekers?io_source=slimmestad.vastgoedmarkt.nl&vakmedia net-approve-cookies=1

https://www.smartdatacity.org/smart-city-tv-opnames-2016/

https://www.smartdatacity.org/smart-city-fixed-posts/

Regionale samenwerking gemeenten, provincie en waterschappen

Gemeente Apeldoorn werkt aan de RES in Cleantech Regio-verband. Apeldoorn stelt deze strategie op, samen met de gemeenten Brummen, Epe, Heerde, Lochem, Voorst en Zutphen en met de waterschappen Vallei&Veluwe en Rijn & IJssel en de provincie Gelderland. Ook belanghebbenden worden in dit proces betrokken. Het is belangrijk om dit in regionaal verband te doen, want een goede inpassing van duurzame energieopwekking en warmte reikt verder dan individuele gemeentegrenzen. De lokale gemeenteraden stellen de Regionale Energiestrategie uiteindelijk vast, samen met de provinciale staten en het algemeen bestuur van de waterschappen.

https://www.apeldoorn.nl/res

https://youtu.be/D34pOkkQhis

Samen met 4 partijen die specifiek in het filmpje genoemd worden:

- Inwoners
- Ondernemers
- Maatschappelijke organisaties
- Overheden

Over Future City

De Future City Foundation is een 'movement of communities' die zich bezighouden met digitalisering en technologisering van regio's, steden en dorpen. Wij verbinden ==professionals bij gemeenten, bedrijven en andere organisaties== met elkaar om ==samen== van die regio's, steden en dorpen slimme gemeenschappen te maken met een gezonder leefomgeving, zoals bedoeld in Sustainable Development Goals van de Verenigde Naties en conform onze Europese democratische waarden.

We denken dat een efficiënte, ==inclusieve== en succesvolle ==samenwerking== tussen ==overheden, bedrijven en technologieprofessionals== kan bijdragen aan het oplossen van de uitdagingen van regio's, steden en dorpen.

Wij geloven in een diepgaande, open, democratische samenwerking en co-creatie met verschillende groepen, waardoor we kunnen innoveren op een manier die anderen niet kunnen.

Future City heeft een eigen FIWARE Lab. De Future City Foundation is de eerste FIWARE iHub van Nederland en heeft een zitting in de Europese Board van de FIWARE Foundation. Onze premium partners zijn: gemeente Amersfoort, Civity, DHM Infra, Economic Board Utrecht, ELBA\REC, Kennedy Van der Laan, gemeente Sittard-Geleen, Provincie Utrecht, Waterschap Vallei en Veluwe en VodafoneZiggo.

https://future-city.nl/team/

Project Partnership

Doel: In 2020 willen we aan de slag met:
>> *Smart Stedenbouw 2.0* – We willen doorpakken op een aantal grote vragen die voortkomen uit ons project Smart Stedenbouw. Bijvoorbeeld: hoe bouw je een democratisch netwerk? Of hoe ontwerp je flexibel. We zijn daarover in gesprek met het Ministerie van BZK, of zij er een city deal van willen maken. *Lees meer.*
>> *Realtime Omgevingsbeleid* – We gaan aan de slag met de impact van digital twins (en vergelijkbare toepassingen) op het openbaar bestuur. Hoe verandert dat? Krijgen we een andere manier van gemeentebestuur en politiek? We willen dat graag het komend jaar onderzoeken en samen het nieuwe boek over bestuurskunde maken. *Lees meer.*
>> *Smart x Groen* – Een van de grootste problemen die er zijn op deze wereld is het teruglopen van de biodiversiteit. Tegelijkertijd snappen we niet zo goed wat er gebeurt. Hoe biodiversiteit werkt. Wat nou als de datawereld zich daarmee gaat bemoeien? Als we smart x groen gaan. Kunnen we een hackathon organiseren die die vagen beantwoordt? *Lees meer.*
Als Smart Friend word je op de hoogte gehouden van de vorderingen en uitgenodigd voor de openbare bijeenkomsten die we rondom de events organiseren. In het kader van een aantal projecten zullen we ook pitchcarrousels organiseren. Daar nodigen we je ook voor uit: als pitcher als bezoeker.

Netwerk: Bij elk onderwerp zetten we een ==netwerk op van bedrijven en overheden==. Denk hierbij aan de provincies, gemeenten, maar ook ==bedrijven die producten en diensten ontwikkelen== op dit gebied en beter willen weten wat de behoefte is van de overheden.
In dit netwerk denken we samen na over de hierboven gestelde vragen.
We zoeken partners in Nederland en de rest van Europa.
We zetten een app-groep op om het netwerk direct te binden.
Onze premium partners nemen deel aan elk project.

Flexibel: Elk project kent zijn eigen opzet en werkt naar een eigen eindproduct. Vaak is dat een publicatie. In alle gevallen organiseren we events om het netwerk op te zetten, bouwen we een appgroep en andere technische tools. Elk project duurt een jaar. Kijk bij de omschrijving van de projecten hoe we dat precies doen.

Betekenisvol: We werken samen naar een concreet eindproduct. Dit willen we in het najaar 2020 presenteren tijdens de Smart City Expo in Barcelona of een ander passend evenement.
Deelnemers aan het project denken samen na over de inhoud van het eindproduct en dat doen we tijdens de evenementen. ==Projectpartners== kunnen actief bijdragen aan het eindproduct. Dat is niet verplicht, maar vergroot natuurlijk wel de betrokkenheid en levert daardoor meer op in kennisontwikkeling en zichtbaarheid.

Wat levert het op? Als projectpartner van Future City word je onderdeel van een actief publiek-privaat-netwerk van koplopers op het gebied van digitalisering en technologisering de stad. Je draagt daar met je eigen organisatie aan bij en je krijgt het podium om dat te vertellen aan de rest van de wereld. Je profiteert van de redactionele-marketing-waarde van het boek zelf en de communicatie die daaromheen wordt gegenereerd. En dat alles op een ontspannen en leuke manier.

Welke bijdrage vragen we?

>> Een projectpartnership kost tussen de 7500 en 12500 euro (excl. btw). Je mag zelf bepalen welk bedrag je bijdraagt. Zo verdelen we de lasten tussen partners naar draagkracht. Als je het lastig vindt om te kiezen, maar wel aangeeft partner te worden, gaan we uit van een bijdrage van 9000 euro.
>> Daarnaast hopen we dat je actief bijdraagt aan de bijeenkomsten en zullen we je ook actief betrekken bij de organisatie daarvan.
>> En je mag actief bijdragen aan het eindproduct. Dat is natuurlijk niet verplicht.
>> Eigenlijk is het simpel: we delen de kosten en de inspanningen. Daarbij is een financiële bijdrage onvermijdelijk. Maar als je er echt wat uit wilt halen, moet je er ook tijd in stoppen.

https://future-city.nl/projectpartner/

Smart City Nederland: 5 voorbeelden

Wat zijn voorbeelden van slimme steden in Nederland, naast de gemeente Zwolle?
https://www.peterjoosten.net/smart-city/

1. Smart City Amsterdam. De regio Amsterdam (via de Economic Board) heeft een platform opgericht met de naam *Amsterdam Smart City* (ASC). Dat platform dient als samenwerkingsverband tussen bedrijven, overheden, kennisinstellingen én de inwoners van de stad met als doel om Amsterdam te ontwikkelen als slimme stad.

https://amsterdamsmartcity.com/organisations/amsterdam-smart-city

8 organizational members

- Community and Program Officer at Amsterdam Smart City

- Program Director at Amsterdam Smart City
- Program and Communication Manager at Amsterdam Smart City
- marketing at Amsterdam Smart City
- Community Manager at Amsterdam Smart City
- Programmanagement + Energy Lead at Amsterdam Smart City
- International Liaison at Amsterdam Smart City
- Strategy Advisor & International Smart City Ambassador at Amsterdam Smart City

2. Smart City Eindhoven. De gemeente Eindhoven houdt zich ook bezig met het concept Smart City. Hoe kan het ook anders in zo'n regio met hoogwaardige technologiebedrijven? De gemeente heeft daarvoor een Urban Data Centre opgericht samen met het CBS. Een ander project is de Smart City App. Dit is een app waarin de laatste informatie over en uit de stad via een aantrekkelijk en overzichtelijk dashboard wordt getoond.

Terug naar de Smart Society. Wat zijn de belangrijkste wensen van bewoners en bedrijven? En kan Eindhoven daaraan tegemoet komen? Sluijter: 'Het is natuurlijk moeilijk om er precies achter te komen wat bewoners en bedrijven nu en in de toekomst willen. Wij zeggen: we omarmen datatechnologie, omdat onze stad daar beter van wordt. Kijk naar onze verkeersregelinstallaties. Die worden gedigitaliseerd en straks aangestuurd door open data. Ook andere partijen - burgers, bedrijven, whizzkids - kunnen van alles met deze data gaan doen. Een mooi voorbeeld daarvan in Eindhoven is AiREAS. Dit is een community van burgers, bedrijven en kennisinstellingen, die geïnteresseerd is in een gezonde leefomgeving. AiREAS heeft veel luchtkwaliteitssensoren in de stad hangen, die continu informatie verzamelen over de luchtkwaliteit. Deze data zijn open en op een website zichtbaar. Als je de data van de verkeersregelinstallaties en die van AiREAS goed met elkaar weet te combineren, kun je eenvoudig zien wat de effecten op de luchtkwaliteit zijn die kunnen optreden bij kruispunten met verkeerslichten; efficiënter en gemakkelijker dan wij het als overheid zouden kunnen doen.'

https://www.smartwayz.nl/nl/actueel/2018/2/smart-city-eindhoven-innovatieve-technologieen-beter-functionerende-stad/#:~:text='Met%20smart%20city%20bedoelen%20we,adviseur%20van%20de%20gemeente%20Eindhoven.

http://smartcityhub.com/governance-economy/this-is-how-eindhoven-runs-its-smart-society-programme/

3. Smart City Utrecht. De gemeente Utrecht kiest weer voor een andere insteek dan Amsterdam en Eindhoven. Utrecht wil een zogenaamd 'living lab' zijn, als een stad die voortdurend zoekt naar *"nieuwe, slimme allianties van vraagstukeigenaren, creatieve makers, bedrijvigheid en de eindgebruikers van de stad."*

Daarnaast houdt de gemeente zich actief bezig met *open data*. Dat is het openstellen van datasets aan inwoners en bedrijven, zodat die er nuttige toepassingen voor kunnen ontwikkelen.

https://agendastad.nl/utrecht-werkt-aan-slimme-en-gezonde-stad-living-lab/

4. Smart City Rotterdam. Is het typisch Rotterdam? De stad noemt zichzelf niet per se een slimme stad, maar doet wel allerlei interessante projecten. Geen woorden maar daden. Zo wordt het Zuidplein in de stad omgebouwd met onder meer slimme afvalcontainers en parkeerplaatsen. De gemeente werkt hiervoor samen met kennisinstellingen, TNO en bedrijven als KPN.

https://www.openrotterdam.nl/rotterdam-zo-slim-als-een-smart-city/content/item?1117262#:~:text=Rotterdam%20ontwikkelt%20zich%20sterk%20als%20stad.&text=In%20de%20plannen%20van%20PBLQ,burgers%20in%20kaart%20te%20brengen.

https://docplayer.nl/4099894-Smart-city-rotterdam-een-visie-op-een-slimme-toekomst.html

5. Sensor City Assen. Assen? Ten opzichte van de andere gemeenten in deze rij, misschien een vreemde eend in de bijt. Toch profileerde Assen zich als slimme stad, vooral op het gebied van sensortechnologie. De gemeente zou 200 sensoren krijgen die alles in de gemeenten zouden kunnen meten. De stad zou een levend laboratorium worden.Het werd een fiasco. Bedrijven gingen failliet, projecten kwamen niet van de grond en er werden grote verliezen geleden. Succesvol een Smart City worden, dat lukt je blijkbaar niet zomaar

https://www.trouw.nl/nieuws/assen-vertilt-zich-aan-utopie-sensor-city~b2638a3b/

Zestien gemeenten en **twee provincies**, **een waterschap**, **vijftien bedrijven** en **veertien maatschappelijke organisaties** werken de komende twee jaar aan twaalf smart city-vraagstukken. Dit met het doel om smart cities tot een hoger niveau te brengen. De partijen doen dit in het kader van de City Deal 'Een slimme stad, zo doe je dat', die op 3 december ondertekend wordt door staatssecretaris Knops (BZK), minister Van Nieuwenhuizen (IenW), minister Grapperhaus van (JenV) en de 51 deelnemers.

Smart cities bieden nieuwe kansen om steden duurzamer te maken, maar hier staan ook risico's op het gebied van privacy en democratie tegenover. Om kansen te benutten en risico's te vermijden, is de City Deal in het leven geroepen. Hierin maken de partijen goede afspraken worden nieuwe werkwijzen ontwikkeld.

'Een slimme stad, zo doe je dat' richt zich op het veranderen van de processen die regio's, steden en dorpen gebruiken bij het ontwerpen, inrichten, beheren en besturen. Hiervoor worden minimaal twaalf nieuwe instrumenten ontwikkeld. Deze moeten de processen veranderen waarmee regio's, steden en dorpen worden ontworpen, ingericht, beheerd en bestuurd. Denk hierbij aan een effectieve datastrategie voor gemeenten, businessmodellen voor de slimme stad of de betrouwbaarheid van burgermeting van luchtkwaliteit, geluid en het grondwater.

De nieuwe tools worden zo ontwikkeld dat deze haalbaar, schaalbaar en deelbaar zijn zodat ook andere steden ze kunnen benutten.

City Deals zijn in 2015 in het leven geroepen door het ministerie van Binnenlandse Zaken en Koninkrijksrelaties (BZK). Het zijn samenwerkingsverbanden waarin steden, ministeries en andere maatschappelijke partners en/of marktpartijen samenwerken aan bepaalde thema's, waaronder cyberveiligheid. In vier jaar tijd worden projecten van deelnemers door de overheid gefinancierd om zo te experimenteren en inzichten op te doen om een landelijk of stedelijk beleid in te voeren.

51 deelnemers

De volgende overheden, bedrijven en maatschappelijke organisaties ondertekenen de City Deal Een slimme stad, zo doe je dat: gemeente Almere, AM, gemeente Amersfoort, Amsterdam Smart City, gemeente Apeldoorn, Arcadis, Argaleo, ministerie van Binnenlandse Zaken en Koninkrijksrelaties, BNA, BNSP, BPD Ontwikkeling, gemeente Breda, BTG, gemeente Capelle aan den IJssel, Civity, gemeente Den Haag, gemeente Deventer, DHM, Economic Board Utrecht, ELBA\REC, gemeente Enschede, FIWARE Foundation, FME, Future City Foundation, gemeente Heerlen, Heijmans, gemeente Helmond, gemeente 's-Hertogenbosch, ICTU, het ministerie van Infrastructuur en Waterstaat, het ministerie van Justitie en Veiligheid, Kadaster, Kennedy Van der Laan, gemeente Maastricht, NVTL, Provincie Overijssel, Over Morgen, Phbm, Platform31, Nationale Politie, Rijksvastgoedbedrijf, Stad Roeselare (België), gemeente Rotterdam, gemeente Sittard-Geleen, VodafoneZiggo, Waterschap Vallei en Veluwe, We-Consultants, WeCity, provincie Zuid-Holland, gemeente Zwolle. Deze City Deal wordt daarnaast gesteund door VNG en de Data- en Kennishub Gezond Stedelijk Leven

https://www.computable.nl/artikel/nieuws/overheid/7101641/250449/overheid-maakt-werk-van-slimme-steden.html

https://www.smartcityhilversum.nl/

Waarom zet Hilversum in op Smart City?

Het gebruik van data en digitale technologie wordt door gemeenten meer en meer ingezet om het welzijn voor bewoners, bezoekers en ondernemers te verbeteren. Deze ontwikkeling noemen we Smart City.

Alle Nederlandse steden zetten in op data, waarbij ze ontdekken dat dit een complexe operatie is. De kans op succes neemt toe als we heldere doelen stellen, bewoners nauw betrekken en externe expertise inzetten.

Heel belangrijk is daarom het voeren van het gesprek met de gebruikers van de stad. In 2017 zijn we daarmee begonnen, en het aantal Hilversummers dat met ons meedenkt groeit nog steeds. In zogenaamde meetups delen we kennis en gaan we na waar de behoefte ligt. De centrale vraag: wat kan slimmer in de stad? Daarnaast werken we aan de inrichting van het HilversumLab. Een centrale, toegankelijke plek waar jong en oud ideeën kunnen opperen en verkennen. Het HilversumLab zal gaan over meer dan alleen Smart City; goede ideeen hebben meer kanten dan alleen technologie.

Bij de ontwikkelingen in Hilversum zijn zeven bedrijven betrokken die vooroplopen op Smart City-gebied: **Atos**, **Dynniq**, **Esri**, **Sorama**, **Sustainder**, **ViNotion** en **VodafoneZiggo**. Zij vormen een krachtig consortium dat meedenkt met de gemeente en in staat is praktische Smart City toepassingen te realiseren.
Met het Stadspanel data gaan we nog een stap verder. Dit panel bestaat uit tien Hilversummers die letten op dataveiligheid, privacy en inclusiviteit. Burgers die vragen of zorgen hebben kunnen zich tot dit panel richten

Smart city team hilversum: Informatie adviseur, Projectleider (2x), projectmedewerker, trainee, Programmanager, businessadviseur en data analist, Entreprise architect en CISO, strategisch adviseur, Stadsregiseur

https://open-hilversum.hub.arcgis.com/

Betrokken partijen

- Gemeente
- Andere gemeenten
- Andere steden
- Watterschapen
- Provincie
- Inwoners/bewoners/burgers
- Ondernemers
- Maatschappelijke organisaties
- Overheden
- Technologieprofessionals
- Bedrijven
- Organisaties
- Netwerk van bedrijven en overheden
- Projectpartners
- Bedrijven ie producten en dienste\grn ontwikkelen
- Kennisinstellingen
- Whizzkids
- Bedrijven als kpn
- TNO(Nederlandse Organisatie voor toegepast-natuurwetenschappelijk)
- Ministeries
- Marktpartijen
- Bezoekers
- Lokale/eigen bedrijven
- Regionale bedrijven
- Instellingen
- Onderwijs
- Werkgevers
- Docenten
- Zorginstellingen
- Talentvolle studenten
- Andere landen/overheden over de grens
- Jong en oud
- Gebruikers van de stad
- Stadspanel met burgers uit die stad
- Politie
- Universiteiten
- VNG (WG Principes voor de digitale samenleving)

Alle gegevens zijn genomen van het centraal bureau voor statistiek (CBS) van Nederland over de periode 2019 en 2020
https://www.cbs.nl/

Banen naar bedrijfstak	aantal duizenden						
	werknemer	zelfstandigen		totaal		% vrouw	
onderwijs	531	90	14%	621	7%	63%	werkloos
handel, vervoer horeca	2191	354	14%	2545	30%	47%	3.8%
Zorg	1362	318	19%	1680	20%	81%	
zakelijkedienstverlening	1696	690	29%	2386	28%	49%	
openbaar bestuur	518	0	0%	518	6%	42%	
industrie en energie	828	62	7%	890	11%	24%	
cultuur recreatie en overige diensten	315	210	40%	525	6%	62%	
bouwnijverheid	316	196	38%	512	6%	12%	
informatie en communicatie	271	54	17%	325	4%	25%	
landbouw en visserij	114	121	51%	235	3%	33%	
financiële dienstverlening	206	9	4%	215	3%	44%	
Verhuur en handel van onroerend goed	67	20	23%	87	1%	45%	
totaal	8415	2124		10539			

		mannen				ervaren gezondheid goed	
Totaal	14466		7156		7310		
1 Laag onderwijsniveau	4236	29%	1933	46%	2303	54%	62%
2 Middelbaar onderwijsniveau	5314	37%	2746	52%	2568	48%	78%
3 Hoog onderwijsniveau	4686	32%	2364	50%	2322	50%	87%
Weet niet of onbekend	230	2%	114	50%	117	51%	61%

Beroepen in de verschillende sectorenop basis van onderwijs niveau zijn gevonden op:
https://www. nationaleberoepengids.nl

https://www.roc.nl/ & https://www.testcentrumgroei.nl/beroepen/sectoren

aantal karakter kaarten in het spel: 8

karakters met dit beroep		waarvan zelfstandig	waarvan vrouw
onderwijs	1	0	0
handel, vervoer horeca	2	0	1
zorg	2	0	1
zakelijkedienstverlening	2	1	1
openbaar bestuur	0	0	0
industrie en energie	1	0	0
cultuur recreatie en overige diensten	0	0	0
bouwnijverheid	0	0	0
informatie en communicatie	0	0	0
landbouw en visserij	0	0	0
financiële dienstverlening	0	0	0
Verhuur en handel van onroerend goed	0	0	0
werkloos	0		-

karakters met dit opleidingsniveau		waarvan vrouw	waarvan gezondheid slecht ervaren
	2	1	1
	3	1	1
	3	1	0
	0	0	0

Leeftijden	Ervaren gezondheid: goed/zeer goed
Leeftijd: 0 tot 4 jaar	97%
Leeftijd: 4 tot 12 jaar	97%
Leeftijd: 12 tot 16 jaar	95%
Leeftijd: 16 tot 20 jaar	89%
Leeftijd: 20 tot 30 jaar	89%
Leeftijd: 30 tot 40 jaar	85%
Leeftijd: 40 tot 50 jaar	81%
Leeftijd: 50 tot 55 jaar	79%
Leeftijd: 55 tot 65 jaar	72%
Leeftijd: 65 tot 75 jaar	68%
Leeftijd: 75 jaar of ouder	64%
totaal	82%

		ervaren gezondheid goed
jonger dan 20 jaar	22%	94%
20 tot 40 jaar	25%	87%
40 tot 65 jaar	34%	77%
65 tot 80 jaar	15%	68%
80 jaar of ouder	5%	64%

hoeveelheid digitale kennis/ vaardigheden	geen kennis/ vaardigheden	geringe kennis/ vaardigheden	Basis kennis/ vaardigheden	meer dan basis kennis/ vaardigheden
18-25 jaar	0%	5%	15%	79%
25-35 jaar	0%	8%	25%	66%
35-45 jaar	0%	11%	28%	58%
45-55 jaar	0%	16%	33%	48%
55-65 jaar	0%	27%	39%	30%
65-75 jaar	0%	30%	40%	18%
75+	1%	32%	21%	7%

huissamenstelling

samenwonend	49%
thuiswonend kind	27%
alleenstaand	18%
alleenstaande ouder	3%
overig	1%
in instelling	1%

karakterrs in deze leeftijd	waarvan gezondheid slecht ervaren	digitale vaardigheden			
		geen	gering	basis	meer dan basis
2	0	0	0	0	1
2	0	0	0	1	1
3	1	0	1	1	1
1	0	0	0	0	0
0	0	0	0	0	0

Karakters in deze huissamenstelling

4
2
1
0
0
0

Speculatieve toekomst technologiën

~ menu ~

Brainstorm futuristische tech

Welkom!

Voor je ligt de menukaart van deze brainstorm. Het bestaat uit drie gangen; een voorgerecht, een hoofdgerecht met twee verschillende opties en een toetje. Ik wil je vragen om deze gerechten in de genoemde volgorde te consumeren en dat je eerst het voorgerecht afmaakt voordat je de andere gerechten leest. Voor het voorgerecht kan je het papier gebruiken dat voor je ligt om je antwoorden op de vragen op te schrijven of schetsen. Voor het hoofdgerecht zal een ander papier beschikbaar worden gesteld.

Ga je gang, en succes met dit zogenaamde diner:

~Voorgerecht ~

Wat is het eerste waar je aan moet denken als je een futuristische technologie/ futuristisch product moet noemen?

Waarom moest je hier aan denken?

Heeft het product/de technologie een positieve of negatieve lading voor jou? Waarom?

Z.O.Z

~Hoofdgerecht~

Ik wil je vragen om na te denken over (smart) technologie in de stad die er op dit moment nog niet is, maar wat er in de toekomst misschien wel zou kunnen zijn. Gebruik je verbeelding om iets te bedenken wat misschien nu nog onrealistisch lijkt, maar wat mogelijk zou kunnen zijn in de toekomt. Niets is te gek, al je ideeën zijn welkom, dus voel je vrij om helemaal los te gaan.

Er zijn twee opties die je op weg kunnen helpen. Je bent vrij om te kiezen of je één van de opties wil gebruiken of beide. Het is zelfs toegestaan helemaal af te wijken van deze opties aangezien ze er alleen zijn om je helpen in het vinden van een richting voor je verbeelding.

~ Gerecht één ~

Om je verbeelding op weg te helpen met het nadenken over futuristische producten/ technologieën is hier een lijst met 14 categorieën van opkomende technologieën. Probeer om een technologie of product te bedenken voor een specifieke categorie en omschrijf deze met woorden of tekeningen. Dit hoeft niet heel gedetailleerd te zijn.

1	Landbouw	8	Vermaak
2	Luchtvaart	9	IT en communicatie
3	Constructie	10	Medisch
4	Materiaal- en textielwetenschap	11	Militair
5	Opto-elektronica	12	Ruimte
6	Elektronica	13	Robotica
7	Energie	14	Vervoer

(deze zijn gebaseerd op de Wikipedia pagina "list of emerging technologies")

~ Gerecht twee ~

Als je meer, of andere, inspiratie nodig hebt zijn hier de Duurzame Ontwikkelingsdoelstellingen. Dit zijn 17 doelstellingen opgesteld in 2015 door de VN om een betere en duurzame toekomst te bereiken voor iedereen, met de intentie om alle doelstellingen in 2030 bereikt te hebben.

Probeer na te denken over het jaar 2030 en hoe een bepaalde technologie geholpen kan hebben, of misschien wel de belangrijkste oplossing was, om een bepaald doel te bereiken.

Schrijf, of teken, deze technologie op het papier en herhaal indien mogelijk voor andere doelstellingen.

~ Toetje ~

Kijk terug op de mooie verschillende futuristische technologieën die je hebt bedacht. Probeer nu na te denken hoe realistisch het is dat deze technologieën daadwerkelijk worden geïmplementeerd in de toekomst. Schrijf bij elke van jouw technologieën het jaartal waarvan jij denken dat ze zouden kunnen worden gebruikt. Neem daarbij 2021 als jaartal als je denkt dat het nu, of later dit jaar, al gebruikt zou kunnen worden.

Is het in jouw ogen positief dat deze techniek in gebruik genomen zou wouden? Voeg een "-" of een "+" toe om te laten zien of de technologie voor jou een positief of een negatief effect zal hebben op het leven in de stad.

Als je niet de eerste persoon bent die dit heeft gedaan zullen er op het papier technologieën staan die anderen bedacht hebben. Je mag hier ook een "-" of een "+" bij schrijven.

Bedankt

voor het nuttigen van dit diner. We hopen dat deze brainstorm naar wens is geweest en dat het uw maag mocht vullen met heerlijke verbeelding. Fijne dag nog toegewenst!

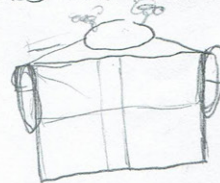LANDBOUW   2025 +
Deep Learning onkruid plukkers
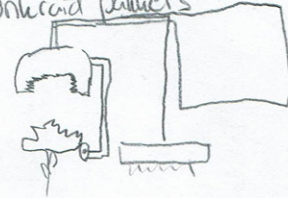
Luchtvaart   2021 + −
Drones die pakketjes bezorgen

Optoelektronica   2040 +
Met licht kanker opsporen in
lichaam, integreerbaar in
bv een metaaldetector

Ruimte   2055 +
Atmospherische bubbelwaar
je in kunt leven op bu
den Mars of de maan

Vervoer   2023 +
Magnetisch voortgedreven
zweefmobielen die zichzelf
bestuurt

Futuristic Tech.

(lu. vervoer)

- - +

... busses waarvoor je kan aanmelden via een app zodat ze je als je je ergens op de route bevindt van de bus op kunnen pikken zodat je niet afhankelijk bent van een bushalte

2030

2025
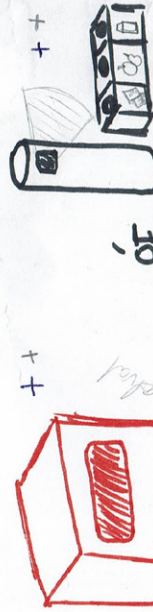
1 AFVALBAK DIE HET AFVAL SCANT EN AUTOMATISCH BINNENIN GOED SORTEERT

ÓF SCANNER DIE HET AFVAL HERKENT EN JOU VERTELT IN WELKE BAK JE HET MOET GOOIEN

2023 + +

energie
dienst
veiligheid
weer
afval
weervoor...
gemeenschap

computergestuurde boot die op zonne-energie die plastic opruimt van zee (2023)

(2031)

drone die afval spot en opruimt. (2023)

Polluted air

Clean air
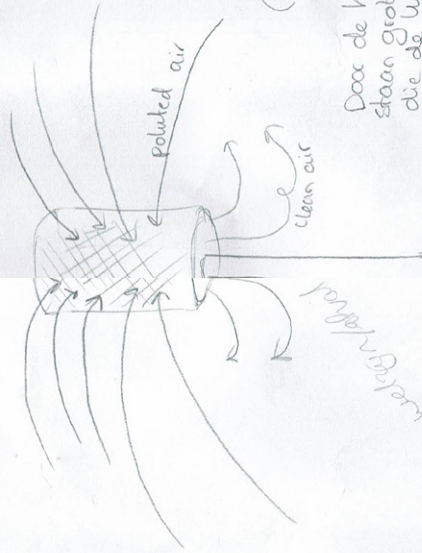
Door de hele stad heen staan grote "air purifiers" die de lucht van de stad reinigen en de meter wad de lucht kwaliteit is

(GPG 11/15)

2028

WEARABLE
- PERSOONLIJKE CO_2 UITSTOOTMETER VOOR BEWUSTWORDING EN VERMINDERING
2028

- / + SCANNER (BIJ BIOSCOOP) DIE SCANT WAT JE GRAAG WILT ZIEN (QUA GENRES) EN GEEFT TIPS
2035

KOELKAST DIE SCANT WAT JE LEKKER VINDT, WAARNA HET IN JE KOELKAST VERSCHIJNT
2050

+ - WEEGSCHAAL DIE WEET HOEVEEL ETEN JE NODIG HEBT, OM VERSPILLING TEGEN TE GAAN
2025
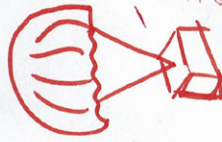
+ - ALTIJD GENOEG VOEDSEL VOOR IEDEN DOOR BEZORGING MET PARACHUTE (3E WERELD LANDEN)
2035

+ 2029
- MEDISCHE CHECK-UP PALEN DOOR DE STAD VERSPREID, ZODAT JE GRATIS EEN CHECKUP KRIJGT EN OP JE GEZONDHEID (BV BLOEDDRUK ENZ.)

In plaats van jullie een lange enquête te sturen heb ik 3 opties: Een beginner, een intermediate en een advanced, in de stijl van de olympische spelen kan je ook gaan voor een echte clean sweep door ze alle drie te doen. Hier zijn de keuzes:

Beginner: https://forms.gle/aHUiC2VTtqxXAtaD6 (~5 min)

Intermediate: https://forms.gle/a4LLruCbRHEvuFjB6 (~8 min)

Advanced: https://forms.gle/MhM6XbbLMLLK7ZB1A (~11 min)

Welke medaille haal jij?

Resultaten analyse

Prestatie

- Een diploma halen
- Tijd stoppen in je carrière, ten koste van vrije tijd
- de bijpassende papieren te halen zodat ik kan aantonen dat ik deze prestatie echt heb behaald. Hiernaast is het voor mij een motivatie om mezelf uit te dagen en te groeien in kunde.
- het afleveren van goede resultaten (school, werk, sport, hobby), vaak vergeleken met andere mensen.

Avontuur

- in het buitenland studeren
- Door de waarde van avontuur zou ik iets wat ik misschien spannend vind wel doen om zo een gevoel van voldoening te krijgen omdat ik iets wat ik misschien spannend vind wel doe. Bijvoorbeeld een avontuur aan gaan en in een ander land gaan leven of backpacken.
- Op een actieve vakantie gaan (backpacker oid.)

Moed

- Bloed doneren
- Moed hoop ik te hebben in mezelf te zijn naar vrienden en mensen om me heen
- Iemand te hulp schieten die beroofd wordt

Afhankelijkheid

- Niet als individu willen leven
- Afhankelijk is een waarde die voor mij betekent dat iets niet zelf lukt. Dat er andere factoren meespelen en er een samenwerking of vertrouwen is vereist om een doel te bereiken.
- Jezelf durven over te geven aan iemand, omdat je het zelf niet kan.
- in een woongemeenschap wonen
- Door afhankelijkheid probeer ik naar mensen hun advies te luisteren en te observeren hoe anderen iets doen
- Voor je laten zorgen als je ziek bent

Vastberadenheid

- Blijven vechten voor je huwelijk als het tegen zit
- Niet opgeven, ook al zit alles tegen
- niet laten ompraten
- Door vastberadenheid vind ik motivatie om mijn studie te halen en mijn energie in vriendschappen en mensen te steken omdat ik geloof dat ik dat kan ondanks dat mensen dat misschien tegenspreken. Gaan voor mijn doel en geloven in mijn kunde tegen verwachtingen van mensen in.

Gezondheid

- Gezondheid gaat voor mij over fysieke en geestelijke gezondheid. Over dat je kunt doen en laten wat je wilt zonder dat je tegen wordt gehouden door je lichaam of je mentale gesteldheid.
- Goed eten om gezond te blijven en me te laten vaccineren
- In staat zijn om te kunnen dansen, ondanks jaren van chronische ziekte.
- Ik streef naar een staat waarin mijn mentale en fysieke gezondheid aansluit bij mijn leven en deze in evenwicht zijn
- Niet elke avond een vette hap nemen
- sporten

Eerlijkheid

- Persoonlijke en algemene normen en waarden proberen na te leven en elkaar erop aan te spreken op een opbouwende manier als dit niet gebeurt om elkaar zo te helpen, niet te oordelen
- Het opbiechten als je een fout hebt gemaakt.
- het behouden van het recht van iedereen op een goed leven en respect voor wie ieder is.

Onafhankelijkheid

- Streven naar meer leren om zo zelf meer te kunnen. Maar ook een grotere drempel ervaren in het vragen naar hulp
- Op jezelf gaan wonen
- Onafhankelijkheid is voor mij een kracht om alleen te kunnen staan. Zelf verantwoordelijkheid te kunnen nemen over een situatie of je leven. En hierbij geen anderen mensen nodig te hebben.
- Het feit dat je voor jezelf kan zorgen en daar geen andere mensen bij nodig hebt.

Integriteit

- Niemand voortrekken, niet vals spelen
- Mijzelf zijn en met anderen omgaan zoals ik wild at er met mij wordt omgegaan
- Als baas van een bedrijf niemand voortrekken

Gerechtigheid

- Altijd eerlijk zijn en ook eerlijkheid promoten in de wereld
- Gerechtigheid heeft de waarde dat het goede gebeurt en als dat niet gebeurt er eerlijke gevolgen zijn.
- Er voor zorgen dat alles eerlijk verdeeld is over mensen (recht, goederen, liefde, zorg)

Vriendelijkheid

- Aardig, net en gul zijn
- Omkijken naar de ander, spontaan helpen bij het boodschappen dragen. Elkaar respecteren en oog hebben voor elkaar.
- Open en zonder oordeel mensen benaderen. Anderen de ruimte geven om zichzelf te zijn. Vriendelijkheid is ontwapenend en laat mensen ontspannen.
- vriendelijkheid gaat denk ik over mensen zich geliefd en gezien laten voelen
- Iemand voor laten gaan bij de kassa
- Groeten naar mensen die ik tegenkom op straat, zodat ze gezien worden
- De vrouw naast je in de trein in je beste Duits uitleggen dat ze inderdaad de volgende halte moet hebben. Door tijd te nemen voor haar vertelt ze hoeveel zin ze heeft om haar vriendin op te zoeken.
- mensen groeten als je ze tegenkomt op straat

Leren

- Nieuwe dingen en kennis tot je nemen
- Kennis opdoen en dat kunnen toepassen
- Zelfverbetering, zelfverwezelijking, verzelfstandelijking en vrijheid.
- ik denk aan nieuwsgierigheid en interesse om in elke situatie en van elk persoon proberen iets te leren
- Een informatief boek lezen
- Spaans leren en in praktijk gebruiken
- Door studeren kon ik weg uit een ongezonde gezinssituatie. Door studeren kan ik ook een baan krijgen die ik met plezier kan uitoefenen ondanks chronische ziekte.
- meedoen aan een activiteit die buiten mijn 'comfort zone' ligt

Liefde

- Je afspraken verzetten voor degene
- Eten koken thuis
- Mijn vriend is mijn "veilige plek" - de plek waar ik maar aan hoef te denken om tot rust te komen als ik overweldigd raak.
- voor iemand afwassen

Vrede

- ik denk aan innerlijke vrede, dat je je geen zorgen maakt, en fysieke vrede, dat er geen oorlog(dreiging) of vijandigheid tussen mensen is.
- Rust, het afwezig zijn van conflict. Berusting in een situatie.
- Ruzies vermijden of goed maken
- Dingen uitspreken die nog uitgesproken moeten worden om in vrede te leven met de mensen om me heen
- vriendelijk blijven tegen iemand die boos is

Perfectie

- Extra lang leren voor een toets
- Hard studeren om hoge cijfers te halen
- Ik zeg nooit dat iets perfect is, tenzij het exact te meten is - bijvoorbeeld een kast die exact in een nis past: die past perfect. In de plaats daarvan zeg ik dat iets geweldig is. Geweldig ligt op een doorgroeiende schaal van blije verrassing.
- als ik een verslag inlever, deze eerst nog een keer doorlezen om te checken op kleine foutjes
- Zorgen dat bijvoorbeeld een apparaat goed werkt
- Foutloos

Veiligheid

- ik denk aan fysieke veiligheid, dat je veilig over straat kunt en dergelijke, en aan sociale veiligheid, dat je vrij bent om dingen te zeggen zonder buitengesloten o.i.d. te worden
- Savonds een donkere straat mijden
- Een veilige plek te zijn voor de meiden op kamp
- In therapie gaan om zelf dat gevoel van veiligheid te kunnen bouwen.
- iemand verdedigen als deze uitgelachen wordt

Eenvoud

- proberen niet te klagen over dingen
- tevreden zijn met wat je hebt
- Van tevoren nadenken hoe ik iets ga doen, om moeilijkheden te voorkomen

Oprechtheid

- Iets vertellen waar je niets trots op bent
- Eerlijk zeggen tegen iemand dat een presentatie niet heel goed ging.
- Een vriend die leert bakken en je een baksel voorzet, eerlijk vertellen dat het niet zo goed is.
- Toegeven dat je iets fout hebt gedaan/ iets hebt kapotgemaakt, ook als je het makkelijk zou kunnen verbergen/ iemand anders de schuld van kan geven.
- Je niet beter voordoen vanwege wat je kan of hebt
- De waarheid vertellen aan iemand als hij dat niet leuk vindt om te horen
- Aangeven dat ik deze enquête wél in wil vullen, maar geen tijd heb voor een clean sweep 😊
- Altijd eerlijk antwoorden op een vraag, ook al is het voor mij voordeliger om dat niet te doen.

Spontaniteit

- Iets samen doen wat niet van tevoren gepland is
- midden op de dag besluiten om een eindje te gaan rijden zonder een specifieke bestemming te hebben.
- Mijn vriend in de avond overhalen om een ijsje te halen bij Van der Poel.
- Een initiatief opstarten
- vrienden uitnodigen om iets leuks te doen
- Een ijsje halen als je daar zin in hebt
- Zonder dat het afgesproken is langsgaan bij iemand voor de gezelligheid
- Zonder van tevoren bedachte reden iets te drinken voor iemand kopen en bij hem/haar gaan zitten.

Begrip

- **Praten**
- gesprek aangaan met mensen die anders denken
- Een vriendin twijfelt over het nemen van het COVID-19 vaccin. In haar geval snap ik het, omdat zij op jonge leeftijd een hersenbloeding heeft gehad.
- een **deadline word opgeschoven** omdat iemand binnen een team door persoonlijke omstandigheden geen werk kan leveren; hierbij accepteert men dit zonder het de persoon kwalijk te nemen
- In gesprekken veel **luisteren** en vragen stellen
- **Meeleven** met iemand wiens relatie net uit gegaan is
- **Smakken** tijdens het eten (Aziaten doen dat omdat ze zo hun eten beter proeven, Nederlanders vinden dat onbeleefd)
- In een **ruzie proberen te begrijpen** waarom de persoon waarmee ik ruzie heb, deed wat hij/zij deed.

Rijkdom

- **Consumeren**
- **dankbaarheid** uitspreken naar mensen om je heen
- Financieel: het **vooruitzicht van het starten met een baan.** Immaterieel: in de ochtend **knuffelend wakker worden** met mijn vriend.
- hard **werken**
- af en toe wat **leuks kopen of mensen trakteren**
- **Uitdelen** van je rijkdom aan andere mensen, dat is een teken dst je zelf genoeg hebt (en dus rijk bent)
- **Delen** 😊
- Ik geloof dat ware rijkdom innerlijke **tevredenheid** is. Daarom probeer ik bijvoorbeeld niet te klagen en tevreden te zijn met wat ik heb.

A++

A+

A

B

C

D

E

F

Start
stadsontwikkeling

Landelijke subsidie

Vervoer	Wonen	Afval	Water

stadsontwikkeling x2

Welzijn	Dienst	Energie	Veiligheid

★★★★

★★★★⌐

★★★

★★★⌐

Start
stadswaardering

★★

★⌐

⌐

★

Kalender

Jaar 1	Jaar 2	Jaar 3 REFLECTIE JAAR
Jaar 4	Jaar 5	Jaar 6 REFLECTIE JAAR	Jaar 7

het Slimme Steden spel
de interactie tussen
technologie & waarden

GEMEENSCHAPPELIJKE WAARDE

stads-
ontwikkeling

stads-
waardering

Schrijf hierboven een waarde die jullie als
inwoners samen delen

BURGERMEESTER

Plaats hier geslaagde
stadsevenementen

Jouw taak is om de stad met zijn inwoners in goede banen te leiden zodat de
stad weer bruisend wordt en de bewoners gelukkig.

Plaats hier je rolkaart

1ᵉ

2ᵉ

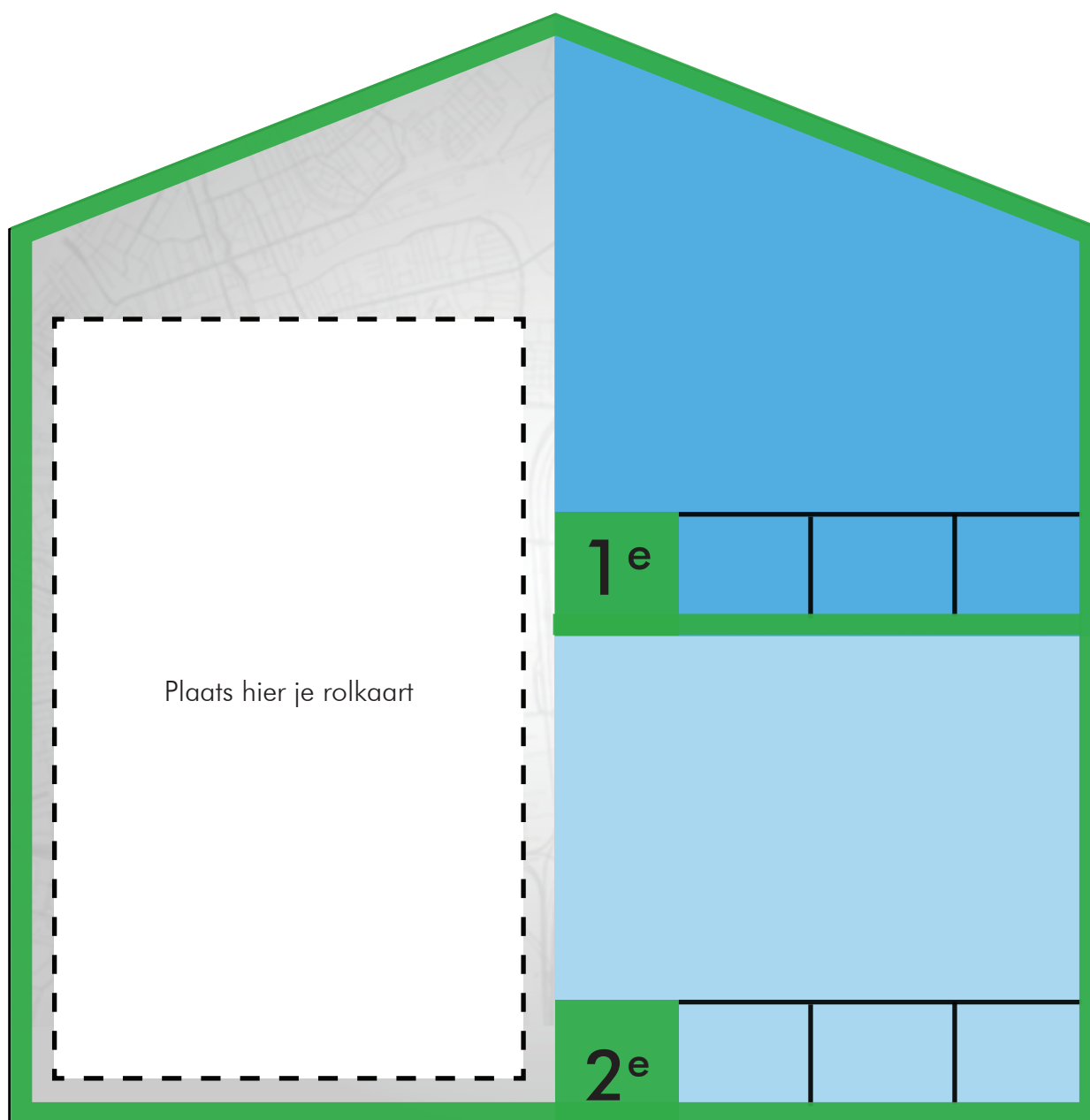## Card 1

toekomst
TECH

Drone bezorgdienst

Wanneer je een pakketje bestelt kan deze zeer snel bezorgd worden met drones naar jouw exacte locatie.

Hierdoor hoeven er minder bestelbusjes op de weg te rijden wat de infrastructuur van de stad verbetert. De drones zijn echter niet geluidloos en het kan vogels en ander wild verjagen.

De burgermeester geeft aan waar het distributiecentrum zit en inwoners kunnen zo de aanvlieg route van de drones bekijken.

waardering + (+ -)

+1 stadsontwikkeling
dienst

Card 2

toekomst
TECH

Slimme veiligheidscamera's

Er zullen speciale veiligheids cameras in de stad geinstalleerd worden die niet alleen criminaliteit in hou buurt in beeld zal brengen, maar ook digitale activeiten zal waarnemen en deze kan koppelen aan de personen op beeld.

Dit zal de stad helpen om niet alleen straatcriminaliteit tegen te gaan, maar ook de cybercriminaliteit. Jij bent beter beveiligd tegen criminaliteit, maar de politie kan je sneller vragen gaan stellen als je verdacht gedrag vertoont.

De burgermeester geeft aan waar de slimme camera's opgehangen zullen worden.

waardering + (+ -)

+1 stadsontwikkeling
veiligheid

Card 3

actueel
TECH

Deelfietsen

Bij stations en andere plekken kan je fietsen vinden die voor openbaar gebruik zijn en die je kan gebruiken om naar je bestemming te komen wanneer een bus, trein of tram je niet verder kan brengen. Dit bied een alternatief voor autorijden en kan ook het aantal bussen wat nodig is verminderen Dit helpt in het verminderen van uitstoot voor de stad en de benodigde parkeergelegenheid. Maar het maakt de stad ook verantwoordelijk voor het onderhouden van de fietsen bij schade of diefstal.

De burgermeester geeft aan waar ophaalpunten van de deelfietsen komen.

waardering + (+ -)

+1 stadsontwikkeling
vervoer

Card 4

actueel
TECH

Telegeneeskunde

Wanneer je een afspraak hebt met je arts kan je dit als patiënt op afstand via een virtuele manier laten plaatsvinden. Artsen zullen vaker kiezen voor een virtuele afspraak.

Hierdoor kunnen artsen meer mensen op een dag spreken en zal de ziekenhuis capaciteit van de stad omhoog gaan. Jij hoeft niet te reizen voor een afspraak en dit scheelt dit kosten, maar hoeveel je kan overbrengen via een video gesprek is beperkt.

De burgermeester geeft aan welk gebouw het ziekenhuis is en inwoners kunnen zo zien hoe lang hun reisteit normaal gesproken was.

waardering + (+ -)

+1 stadsontwikkeling
welzijn

Card 1

toekomst
TECH

3D huizen printer

Deze hangar kan huizen printen en daarbij informatie gebruiken over de huizenmarkt zodat de huizen aansluiten op de behoeften van de woningmarkt.

Hierdoor zullen er in de stad vaker oude (niet significant historische) panden worden vernietigd in plaats van gerenoveerd, wat het stadbeeld aanpast en oudere cultuur kan laten verdwijnen. Als jij op zoek bent naar een woning is er een grotere kans dat er iets beschikbaar is wat aansluit bij jouw behoeften.

De burgermeester geeft aan waar de hangar zal komen te staan.

waardering + (+–)

+1 stadsontwikkeling
wonen

Card 2

toekomst
TECH

Slimme water sensoren

Er zullen slimme meters in watervoorzieningen en bij huishoudens geplaatst worden waarmee waterverbruik en kwaliteit kan worden bijgehouden zodat jij gewaarschuwd wordt voor verontreinigd water of overmatig water gebruik.

Wanneer er water te kort is kan de stad het watergebruik per huishouden beperken om te voorkomen dat de landbouw en de de natuur te weinig water heeft. Wanneer er een water overschot is zat dit ook beter te reguleren zijn. Als geen enkele speler weigert een meter te plaatsen zal de stadsontwikkeling met 1 extra omhoog gaan.

Bij elk huis van de spelers die dat willen mag een sensor getekend worden. En de burgermeester geeft aan waar waterreservoirs komen om het water overschot te reguleren.

waardering + (+–)

+1of 2 stadsontwikkeling
water

Card 3

TECH

Energieverbruik-tracking

Jouw woning, en alle andere woning in de stad, worden voorzien van slimme meters die het elektriciteitsverbruik bijhouden. Het zal jou feedback geven over je verbruik en hoe je daarop kan besparen.

Voor de stad zal dit een beter inzicht geven in het totale verbruik van de stad zodat die verbeterd kan worden. De stad zal wel jou verbruik gegevens tot zijn beschikking hebben. Als geen enkele speler weigert een meter te plaatsen zal de stadsontwikkeling met 1 extra omhoog gaan.

Bij elk huis van de spelers die dat willen mag een sensor getekend worden.

waardering + (+–)

+1 stadsontwikkeling
energie

Card 4

TECH

Automatische afvalscheider

Wanneer je afval in openbare ruimtes weggooit hoef je zelf niet na te denken over het sorteren, de slimme afvalcontainer zal namelijk zelf het afval sorteren.

Voor de stad betekent dit dat het verwerken van afval en het recyclen van materialen een stuk makkelijker zal gaan. Voor toeristen of inwoners zal het ook makkelijker gaan maar verkleint het de kennis en bewustzijn over afvalscheiding.

De burgermeester geeft aan waar deze slimme afvalcontainers komen te staan.

waardering + (+–)

+1 stadsontwikkeling
afval

STADSGEBEURTENIS

Een besmettelijk griepvirus raast door het land en is ook in jullie stad aangekomen. De stadswaardering daalt tenzij jullie een welzijn en een water technologie in de stad hebben.

Tenzij welzijn en water in de stad aanwezig zijn
-2 punten

STADSGEBEURTENIS

Jullie stad organiseert in de winter een speciale wintermarkt waar veel toeristen verwacht worden. Dit levert stadsontwikkeling op wanneer jullie een vervoer technologie en een afval technologie in de stad hebben.

Indien vervoer en afval in de stad aanwezig zijn
+ 2 punten

STADSGEBEURTENIS

Er is een migratiegolf naar de stad en daardoor zijn meer woningen en werkgelegenheid nodig. Ook zal dit energie kosten. De stadswaardering daalt tenzij je een wonen en een energie technologie in de stad hebt.

Tenzij energie en wonen in de stad aanwezig zijn
-2 punten

STADSGEBEURTENIS

Een groot Europees evenement komt naar jullie stad. Dit levert stadsontwikkeling op wanneer jullie een dienst technologie en een vervoer technologie in de stad hebben

Indien dienst en veiligheid in de stad aanwezig zijn
+ 2 punten

Je besluit de stad te verlaten en in jouw plaats komt er iemand anders in de stad wonen.

PERSOONLIJKE GEBEURTENIS

Leg je rolkaart en waarden af en neem een nieuwe rol aan

Indien de burgermeester deze kaart trekt:
leg de kaart dicht weer terug

Volwassene
Horeca-assistent

Je hebt al een aantal jaren ervaring met het werken in hetzelfde restaurant. Je hebt een chronishe aandoening, maar met de juiste medicijnnen heb je het meestal onder controle.

Geef aan waar je woont en waar het restaurant staat

Waargenomen gezondheid	Huis samenstelling	Digitale kennis	Opleidings niveau

55+
Buschauffeur

Omdat je toe was aan een nieuwe uitdaging ben je nu met plezier als buschauffeur aan het werk na eerst iets anders te hebben gedaan.

Geef aan waar je woont en welke busroute je rijdt

Waargenomen gezondheid	Huis samenstelling	Digitale kennis	Opleidings niveau

Jongvolwassene
Partymanager

Na het afronden van je opleiding ben je voor jezelf begonnen als partymanager. Het is af en toe stresvol, maar het lijkt goed te lopen.

Geef aan waar je woont

Waargenomen gezondheid	Huis samenstelling	Digitale kennis	Opleidings niveau

Jongvolwassene
Medewerker Tankstation

Je bent nog bezig met het afronden van je opleiding, maar werkt bij een tankstation om geld bij te verdienen.

Geef aan waar je woont en waar het tankstation is

Waargenomen gezondheid	Huis samenstelling	Digitale kennis	Opleidings niveau

55+
Chirurg

Je hebt al vele jaren ervaring als chirurg, woont alleen en hebt veel kennis over technologie.

Geef aan waar je woont en waar het ziekenhuis is

Waargenomen gezondheid	Huis samenstelling	Digitale kennis	Opleidings niveau

Volwassene
Cyber Security Specialist

Je werkt als cyber security specialst bij een klein bedrijf met een goede naam en woont samen met je partner.

Geef aan waar je woont en waar je kantoor is

Waargenomen gezondheid	Huis samenstelling	Digitale kennis	Opleidings niveau

Gepensioneerd
Filosofie Docent

Je hebt eigenlijk al gepensioneerd, maar blijft toch nog even werken als filosofie docent. Je hebt regelmatig last van je longen en woont samen met je partner.

Geef aan waar je woont en waar de school staat

Waargenomen gezondheid	Huis samenstelling	Digitale kennis	Opleidings niveau

Jongere
Verpleegkundige

Je woont nog bij je ouders, maar doet een opleiding tot verpleegkundige waarvoor je een klein eindje moet reizen.

Geef aan waar je woont en waar het station is

Waargenomen gezondheid	Huis samenstelling	Digitale kennis	Opleidings niveau

PRESTATIE	AVONTUUR	MOED
Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier
AFHANKELIJKHEID	VASTBERADENHEID	GEZONDHEID
Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier
GERECHTIGHEID	VRIENDELIJKHEID	LEREN
Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier
EERLIJKHEID	ONAFHANKELIJKHEID	INTERGRITEIT
Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier

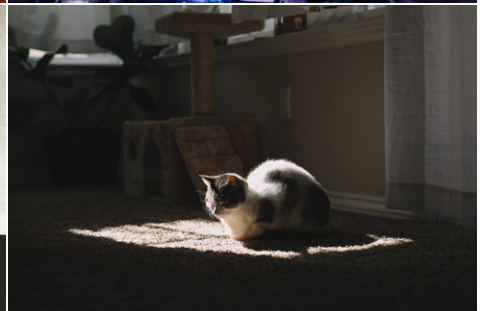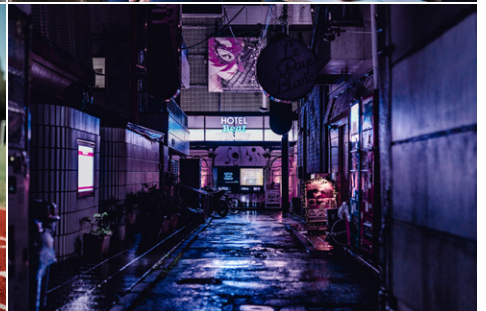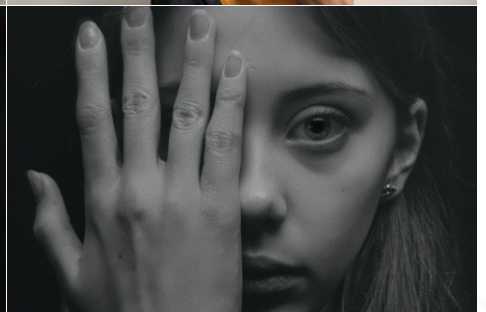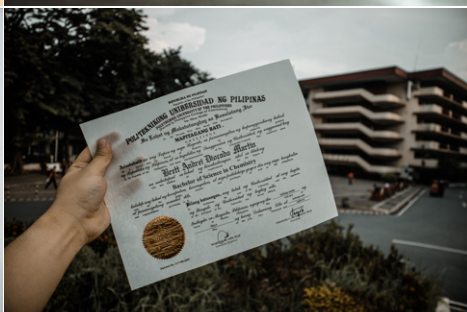| LIEFDE	VREDE	PERFECTIE
Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier
VEILIGHEID	EENVOUD	OPRECHTHEID
Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier
SPONTANITEIT	BEGRIP	RIJKDOM
Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier	Wat doe of denk je vanwege deze waarde? Plaats je afbeelding hier

Burgerschap — FASE 1

- Trek een rolkaart en twee waarden
- Zoek voor elke waarde een afbeelding
- Voer de tekenopdracht uit

BURGER

FASE 2

Start beurt

- Gooi dobbelsteen voor landelijke subsidie
- Kies kaart rond de stad en bekijk kaart

Stel wel voor

- Leg uit waarom
- Streep jaar af
- Burgers plaatsen fiches
- Burgermeester neemt over

Stel niet voor

- Leg dicht terug
- Beurt afgelopen

Gebeurtenis

- Leg open terug
- Beurt afgelopen

ALLE BURGERS

Afgewezen

- Neem fiches terug

Aangenomen

- Plaats fiches onder juiste waarde

Beurt afgelopen
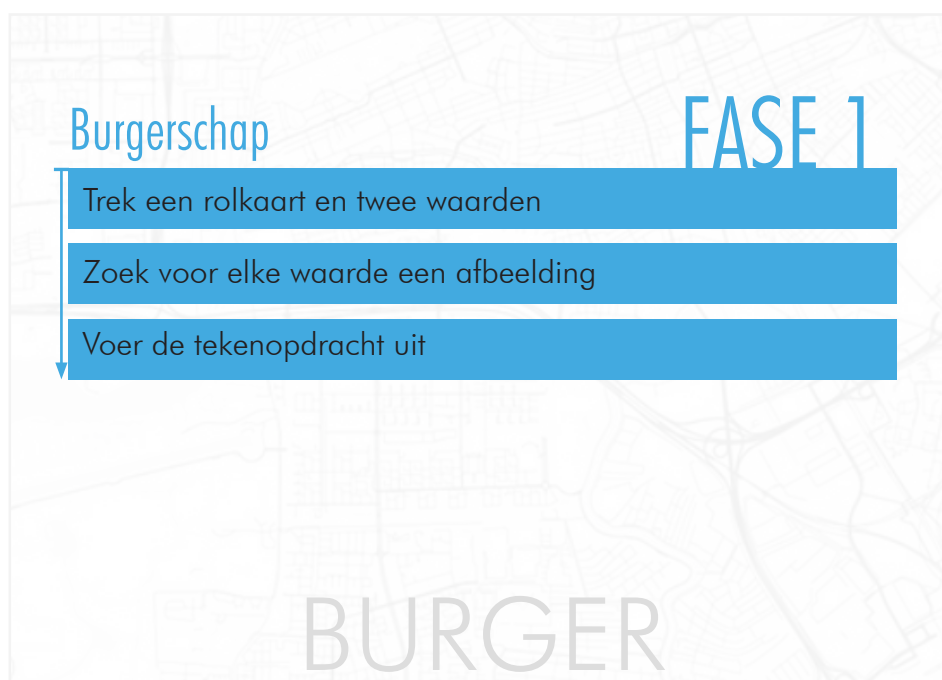
Stadsvoorbereiding — FASE 1

- Schud de gebeurteniskaarten
- Leg de bovenste open op een vak op het bord
- Schud de rest van de gebeurteniskaarten met de technologiekaarten
- Leg de 7 bovenste kaarten van die stapel dicht op de overgebleven vakken
- Teken op de kaart waar jij als burgermeester woont

Stadsdoel

- Vraag de burgers hun rol en waarden voor te stellen
- Bepaald met de burgers wat een gemeenschappelijke stadswaarde is
- Bepaald het stadsontwikkeling doel en het stadswaardering doel
- Schrijf dit allemaal op het burgermeesterhuis in de goede vakken

BURGERMEESTER

Start beurt — FASE 2

- Gooi dobbelsteen voor landelijke subsidie
- Kies kaart rond de stad en bekijk kaart

Stel wel voor

- Leg uit waarom
- Streep jaar af
- Burgers plaatsen fiches
- Ondervraag burgers

Stel niet voor

- Leg dicht terug

Gebeurtenis

- Leg open terug

Beurt afgelopen

NEEM HIER OVER VAN BURGER

Aannemen

- Verplaats stadswaardering pion
- Verplaats stadsontwikkeling pion
- Voer tekenopdracht uit
- Burgers pakken fiches terug
- Schuif technologie naar stad

Afwijzen

- Leg technologie op aflegstapel
- Leg een nieuwe kaart gesloten op lege vakje

Beurt afgelopen

Rolverdeling

Geeft de speler die het beste goede vragen kan stellen het burgermeesterhuis en de andere spelers de burgerhuizen. Schud de rolkaarten en waarde-kaarten. Leg het bord met de stadskaart op het midden van de tafel.

Fase 1: Voorbereiding
Burgerschap

Elke burger trekt 1 rol kaart en 2 waarde-kaarten. Leg deze op het burgerhuis.

Elke burger in de stad heeft zijn eigen waarden, en zij interpreteren die waarde elk op hun eigen manier. Om die interpretatie weer te geven mag elke burger voor zijn waarden een afbeelding zoeken die weergeeft wat je doet of denkt vanwege die waarde en hoe jij, als jouw rol, deze vorm geeft.

Welke waarde vind jij voor je rol op dit moment het belangrijkst? Leg deze bovenaan in je huis neer en de andere waarde onderaan.

Voorbeeld: Mara heeft als rol een buschauffeur van 55+ met de waarden rijkdom en perfectie. Voor rijkdom heeft zij een afbeelding gekozen met familie er op aangezien haar rol rijkdom ziet als het hebben van familie. Voor de waarde perfectie heeft zijn een afbeelding gekozen met een schot in de roos omdat ze perfectie ziet als recht op je doel af gaan. Ze vindt dat haar rol rijkdom het belangrijkste is op dit moment dus legt zij deze bovenaan in het huis en de waarde perfectie onderaan.

Op elke rolkaart staat ook een tekenopdracht voor de stadskaart. Voer deze ook allemaal uit, ieder met zijn eigen kleur stift.

Stadsvoorbereiding

De burgermeester schud alle gebeurteniskaarten. Een daarvan legt hij open op een van de vakjes rond de stad. Als het geen stadsgebeurtenis kaart is maar de persoonlijke gebeurtenis kaart is moet er een andere gebeurteniskaart gepakt worden. De persoonlijke gebeurtenis kan dan weer terug in de gebeurteniskaarten stapel.

Schud de rest van de gebeurtenis kaarten met de technologiekaarten. Leg de bovenste zeven van deze kaarten dicht op de overgebleven vakken op het bord.

Teken op de kaart met de zwarte stift waar jij als burgermeester woont op de stadskaart.

Stadsdoel

Nu is het de beurt aan de burgermeester. Zijn taak is om de stad als geheel in de gaten te houden en te letten op alle verschillende burgers. Daarom mag hij of zij nu aan elke burger vragen zijn of haar rol en waarden voor te stellen aan de rest van de stad. ▶
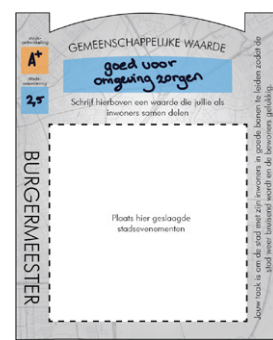
Gemeenschappelijke waarde
Overleg als burgermeester met de burgers wat een gemeenschappelijk doel of waarde voor de stad is. Neem hierbij ieders waarde mee in je overwegingen. Wanneer dit gemeenschappelijke doel of stadswaarde is gekozen schrijf je hem op in het juiste vakje op het burgermeester huis.

Stadsontwikkeling en stadswaardering doel
Kies wat jullie uiteindelijk willen bereiken met de stad wat betreft de stadswaardering en stadsontwikkeling. Hoeveel sterren en welk label willen jullie aan het eind hebben? Baseer dit op jullie gezamenlijke stadsdoel. Schrijf dat ook op in de gekleurde vakjes op het burgerhuis.

Fase 2: Stadsopbouw

Start beurt
Begin je beurt als burger of als burgermeester met het gooien van de dobbelsteen. Hiermee wordt bepaald wat de mogelijke landelijke subsidie zal zijn als er een technologie voorstel komt. Deze subsidie zal betekenen dat een technologie uit die categorie 2x zo veel stadsontwikkeling punten oplevert.

Hierna mag je een kaart pakken die in een van de vakken rond de stad ligt.

Als het een stadsevenement is draai hem dan meteen om.

Technologie voorstel

Stel technologie voor
Als het een technologievoorstel is: lees deze en kijk of het bij je waarden past. Kijk als burger of het bij jou eigen waarden past. Als burgermeester kijk je of het past bij de stadsdoelen. Past het niet?, leg hem dan op de kop weer terug. Past het wel, laat hem de andere spelers zien en leg uit waarom jij denkt dat het goed is voor jou en voor de stadGeef feedback op technologie:

Nu er een technologie is voorgesteld zal de stad dit jaar besteden aan het wel of niet implementeren van deze technologie. Streep daarom 1 jaar van de kalender af.

Feedback geven op technologie
Elke burger kijkt nu voor zichzelf of de technologie bij zijn of haar waarden past. Helpt de technologie bij het uitleven van een waarde? Leg dan een + fiche op de voorgestelde technologie kaart. Gaat het tegen je waarde in of bemoeilijkt het je om je waarde uit te voeren? Leg dan een – fiche op de technologie. Voor je eerste waarde een groot fiche, voor de 2e waarde een kleine. ▶

Sta je er echt helemaal neutraal in, dan hoef je geen fiche op te leggen, maar probeer dan toch na te denken welke invloed de technologie op je waarden kan hebben.

De burgermeester vervolgt zijn beurt, of neemt de beurt van een burger over. Hij of zij vraagt de burger uit te leggen waarom hij of zij welk fiche heeft opgelegd. Daarbij mogen onderling ook verhelderende vragen gesteld worden.

Voorbeeld: Anne heeft als waarde eerlijkheid. Ze interpreteert die waarde als "jezelf durven zijn". Ze vindt dat de technologie "Drone Bezorgdienst" niet bevorderlijk is voor haar waarde eerlijkheid. Dit omdat mensen zichzelf moeten kunnen zijn in de winkels waar ze hun boodschappen doen. Als mensen makkelijker anoniem hun spullen online bestellen, creëer je minder een sfeer waarin mensen zichzelf durven zijn tijdens het boodschappen doen. Daarom legt ze een - fiche op.

Aannemen of afwijzen

De burgermeester heeft het laatste woord. Hij vat kort de voors en tegens samen en voegt zijn eigen mening daar aan toe. Hoe draagt het bij aan het gezamenlijke stadsdoel? Hij mag extra vragen stellen en de burgers nog een kans geven om hun fiches aan te passen.

Afwijzen
Wanneer de burgermeester er voor kiest om het voorstel af te wijzen legt hij de kaart onderop de stapel met technologie en plaatst een nieuwe technologiekaart dicht op het lege vakje. De burgers nemen hun fiches weer terug en de volgede speler is aan de beurt.

Aannemen
Wanneer de burgermeester er voor kiest om het voorstel aan te nemen verplaatst hij de stadsontwikkeling pion overeenkomstig het aantal punten dat de technologie oplevert. Ook de stadswaardering pion mag verplaatst worden, een stap vooruit voor elk groot + fiche, een stap achteruit voor elk groot – fiche. Voor elke 2 kleine +/- fiches mag de pion ook 1 vooruit of achteruit. Hierna neemt elke burger zijn fiches terug maar legt deze in het vakje onder de bijbehorende waarde.


De technologie mag open op het vakje blijven liggen waar het vandaan kwam, maar mag over het grijze vlak, richting de stad geschoven worden.

De burgermeester voert de tekenopdracht uit, daarna is het de beurt aan de volgende speler.

Fiches in burgerhuis

Wanner het maximaal aantal fiches in de hokjes onder de waarden in het burgerhuis gevuld is, mogen de – fiches tegen de + fiches worden weggestreept zodat er weer ruimte is voor nieuwe fiches.
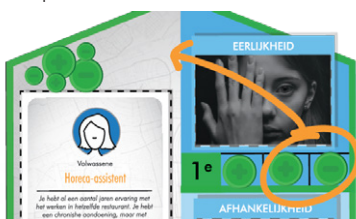
Gebeurtenis

Wanneer er een gebeurteniskaart wordt omgedraaid blijft deze open op het bord liggen. Wanneer er punten te behalen vallen kunnen die alleen geïnd worden wanneer de goede technologie kaarten in de stad zijn. Wanneer er punten verloren gaan, moeten deze meteen met de pion al aangegeven worden en mag het alleen terug gezet worden wanner de juiste technologieën in de stad zijn. De beurt van de speler die de kaart omdraaide is ook voorbij en de volgende speler is aan de beurt.

De gebeurteniskaart blijft dan ook liggen totdat aan de voorwaarden is voldaan. Wanneer dat zo is mag de burgermeester de kaart op zijn burgermeesterhuis leggen en mag er een nieuwe kaart van de stapel dicht op het lege vak gelegd worden.

Bijzondere gebeurtenis
Inwoners kunnen ook verhuizen naar een andere stad en nieuwe inwoners kunnen ook in de stad gaan wonen. De gebeurtenis verhuizen is een bijzonder gebeurtenis kaart die geld voor de persoon die hem omdraait, indien het een burger is. Hierbij moet de burger zijn waarden en rol afleggen en nieuwe pakken. Omdat er nieuwe waarden in de stad zijn gekomen is het verstandig als de burgermeester opnieuw naar het stadsdoel kijkt en eventueel aanpast.

Reflectie jaar

Elk derde jaar in het spel is een reflectie jaar. Burgers veranderen door de jaren heen en hun waarden kunnen daardoor ook veranderen, helemaal doordat de stad om hen heen verandert. Elke burger zoekt daarom nieuwe afbeeldingen voor hun waarden. Dit kunnen vergelijkbare afbeeldingen zijn als ze hun waarden niet heel anders interpreteren, maar het kan ook zijn dat de waarde in nieuwe invullen gekregen heeft. Kijk ook naar welke waarde je de komende drie jaar wil focussen. Vind je je eerste waarde nog steeds het belangrijkst? Of vind je het belangrijker dat er iets gebeurd in de stad naar aanleiding van je tweede waarde. Deze volgorde mag je nu omwisselen met bijbehorende fiches.

Einde van het spel
Stadsdoel

Het spel is afgelopen wanneer alle geplande jaren op de kalender voorbij zijn, of wanneer de hele stad is volgebouwd. Hoeveel jaren er gespeeld wordt, kan van te voren worden afgesproken. Er dienen wel minimaal 3 jaren gespeeld te worden.

Wanneer dit zo is kijkt de burgermeester of het stadsdoel bereikt is. Ten eerste naar de stadsontwikkeling en de stadswaardering. Is behaald wat van te voren is opgeschreven? Dan hebben jullie gewonnen. Maar kijk ook naar de gezamenlijke stadswaarde. Zijn de technologieën in lijn hiermee?

Burgerdoel

Voor elke burger afzonderlijk is het het doel om elke waarde gevuld te krijgen met + fiches. Wanneer deze voor beide waarden gevuld zijn op het eind heb je als burger helemaal je plekje gevonden in de stad en heb je voor jou persoonlijk ook gewonnen.

Zijn de stadsdoelen of persoonlijke doelen niet bereikt? Hoe komt dat, wat hadden jullie anders kunnen doen?

1x Bord met kaart

toekomst
TECH

3D huizen printer

Deze hangar kan huizen printen en daarbij informatie gebruiken over de huizenmarkt zodat de huizen aansluiten op de behoeften van de woningmarkt.

Hierdoor zullen er in de stad vaker oude (niet significant historische) panden worden vernietigd in plaats van gerenoveerd, wat het stadsbeeld aanpast en oudere cultuur kan laten verdwijnen. Als jij op zoek bent naar een woning is er een grotere kans dat er iets beschikbaar is wat aansluit bij jouw behoeften.

De burgemeester geeft aan waar de hangar zal komen te staan.

7x Technologiekaart

STADSGEBEURTENIS

Een groot Europees evenement komt naar jullie stad. Dit levert stadsontwikkeling op wanneer jullie een dienst technologie en een vervoer technologie in de stad hebben

Indien dienst en veiligheid in de stad aanwezig zijn

+ 2 punten

5x (Stads)gebeurtenistkaart

55+
Buschauffeur

Omdat je toe was aan een nieuwe uitdaging ben je nu met plezier als buschauffeur aan het werk na eerst iets anders te hebben gedaan.

Geef aan waar je woont en welke busroute je rijdt

Waargenomen gezondheid	Huis samenstelling	Digitale kennis	Opleidings niveau

8x Rolkaart

Stadsvoorbereiding · FASE 1
- Schud de gebeurteniskaarten
- Leg de bovenste open op een vak op het bord
- Schud de rest van de gebeurteniskaarten met de technologie kaarten
- Leg de 7 bovenste kaarten van die stapel dicht op de overgebleven vakken
- Teken op de kaart waar jij als burgemeester woont

Stadsdoel
- Vraag de burgers hun rol en waarden voor te stellen
- Bepaald met de burgers wat een gemeenschappelijke stadswaarde is
- Bepaald het stadsontwikkeling doel en het stadswaardering doel
- Schrijf dit allemaal op het burgemeestershuis in de goede vakken

BURGERMEESTER

1x Burgemeester spiekbriefje

67x Waarde-afbeeldingkaart

PRESTATIE

Wat doe of denk je vanwege deze waarde?

Plaats je afbeelding hier

21x Waarde-kaart

Burgerschap · FASE 1
- Trek een rolkaart en twee waarden
- Zoek voor elke waarde een afbeelding
- Voer de tekenopdracht uit

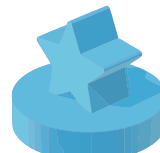BURGER
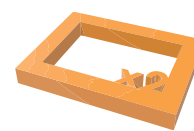
4x Burger spiekbriefje
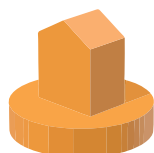
1x Stadsontwikkeling pion

1x Stadswaardering pion

1x Subsidie aanduider

1x Dobbelsteen

SPELONDERDELEN

GEMEENSCHAPPELIJKE WAARDE

stads-ontwikkeling

stads-waardering

Schrijf hierboven een waarde die jullie als inwoners samen delen

Plaats hier geslaagde stadsevenementen

BURGERMEESTER

Jouw taak is om de stad met zijn inwoners in goede banen te leiden zodat de stad weer bruisend wordt en de bewoners gelukkig.

1x zwarte whiteboard stift

1x Burgermeesterhuis

Plaats hier je rolkaart

1ᵉ

2ᵉ

4x Burgerhuis

3x Grote plusfiches per kleur

3x Grote minfiches per kleur

3x Kleine plusfiches per kleur

4x gekleurde whiteboard stift

3x Kleine minfiches per kleur

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het Slimme Steden spel

de interactie tussen technologie & waarden

Een nieuwe gemeente, verschillende bewoners, een stad die toe is aan vernieuwing. Dat is de situatie waarin jullie spelen. De vernieuwing komt door verschillende slimme technologieën. Deze hebben voordeel voor de stad en zal de stad helpen in zijn stadsontwikkeling die nu nog achterloopt.

Maar wat willen de bewoners? Zij hebben elke hun eigen waarden die bepaalt hoe ze doen en denken. Ook over hoe ze denken over die slimme technologie mogelijkheden. De technologie zal weer invloed hebben op wat ze in de stad kunnen doen. Draagt een nieuwe technologie bij aan de waarde die ze hebben? Of gaat het juist in tegen die waarde? Misschien verandert de waarde wel door nieuwe inzichten van de technologie. En wat komt de stad ten goede?

Het een hoeft niet tegenover het ander te staan, maar soms kan het een uitdaging zijn om de balans te vinden tussen de ontwikkeling van de stad, en rekening houden met de waarden van de inwoners. Deze uitdaging is waar het om draait bij dit slimme steden spel.
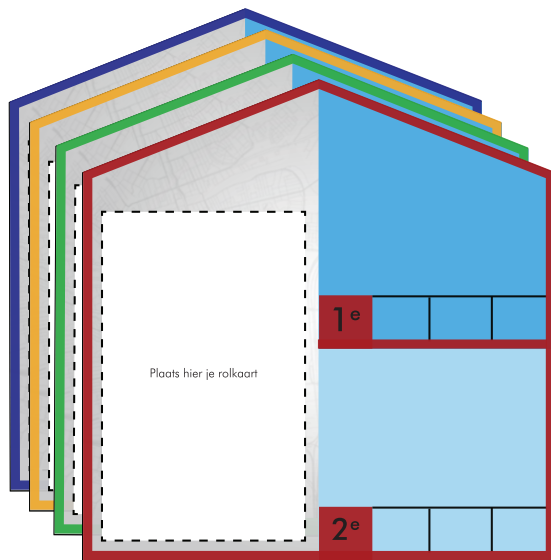
Maak niet alleen slimme, maar ook waardevolle keuzes.

Steden krijgen van verschillende kanten voorstellen voor zogenaamde verbeteringen voor de stad in de vorm van slimme technologie. Wanneer een gemeente overweegt deze in hun stad te bouwen, is het belangrijk de waarden van haar bewoners mee te nemen. Niet alleen omdat de bewoners de stad vormen, maar ook omdat zij de technologie vormen en door de technolgie gevormd worden. En soms anders dan jij denkt. Dit spel is ontwikkeld om over de invloed van technologie en waarden op de stad in gesprek te gaan. Dit terwijl je je inleeft in ee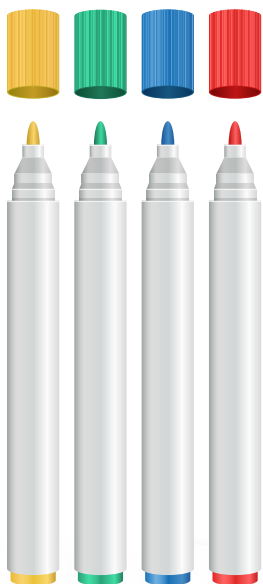n personage die misschien anders denkt dan jij zou doen.