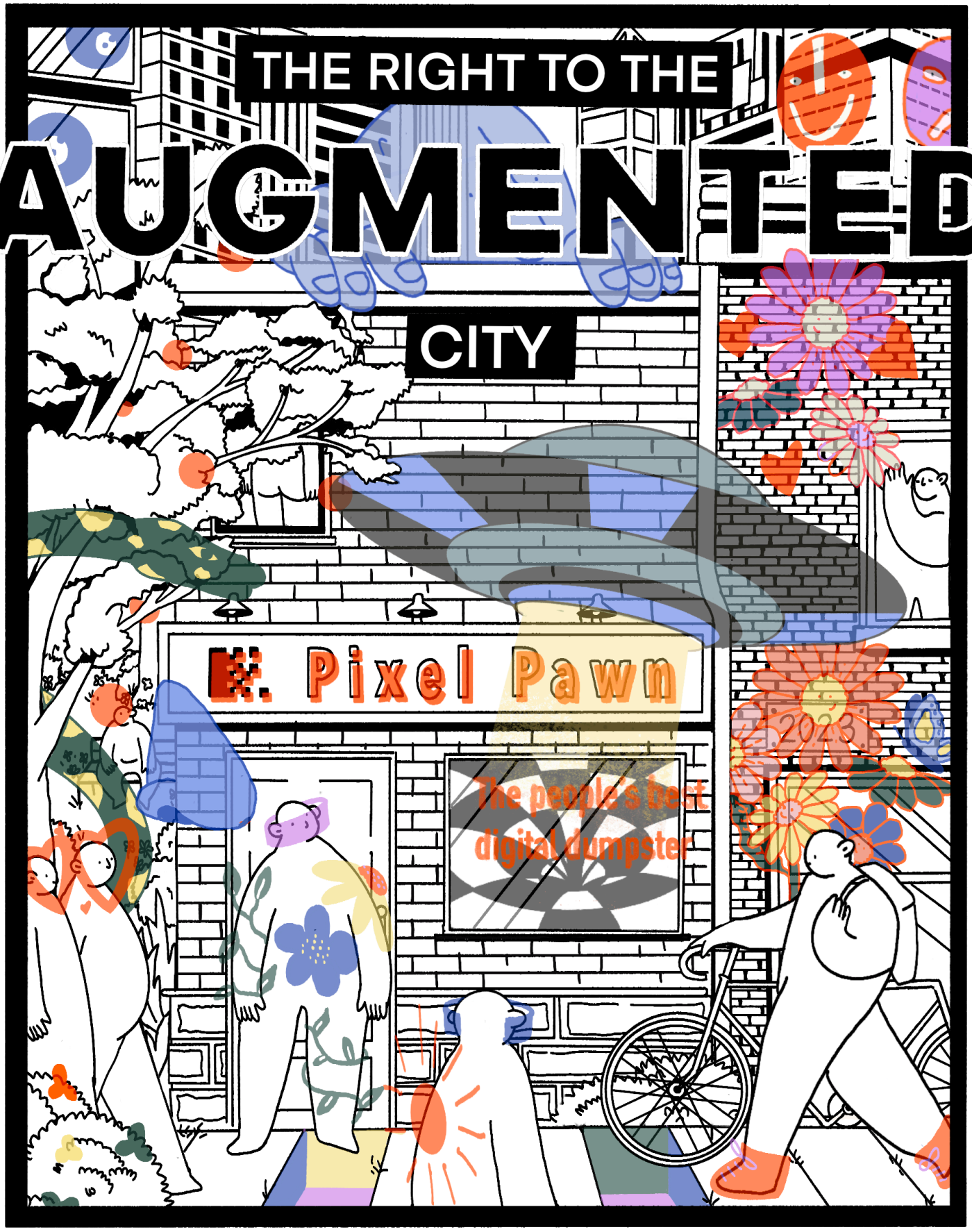
THE RIGHT TO THE AUGMENTED CITY



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My own, unless otherwise noted

PHOTOS
My own, unless otherwise noted

The right to the augmented **city**

The augmented city explores a future where augmented reality has established itself as a new digital public infrastructure, integral to mediating interactions between citizens and their city. I did not look only at a single app augmenting one physical location. This project examines the impact of an ecosystem of augmentations, available through private companies that have built the infrastructures that enable AR experiences in every corner of a city, especially public places. This allowed me to begin examining the different ownership models that could emerge as this technology becomes more ubiquitous in urban environments. Ultimately, my goal was to explore how strategic design can help mediate the power dynamics underpinning location-specific digital content. Developing digital protocols for the benefit of citizens and prioritizing their right to the (digital) commons over private, foreign tech companies.

Using placemaking, Henri Lefebvre's "right to the city" and Sabina Andron's "right to the surface" concepts, I approached the speculative AR-layer from a citizen-centric perspective. The use of strategic design methods enabled me to contribute to this field as a designer, as it provides a framework that moves between scales, from minor digital interactions to high-level policy implications.

The final deliverable is a set of building blocks that define an alternative approach to crafting the augmented city. These building blocks were then used to propose new digital rights for citizens that illustrate possible ways for cities to approach location-based AR content that prioritizes social good over capitalist gain. The rights are an exploration of how we can embed collective urban values into the design of this system, one that broadens the meaning of citizenship to include the digital realm.

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Motivation

I believe design upholds power

If there is anything I have learned after 6 years of design education, and 2 years as a practicing digital designer, it's this: designers tend to think that with a new app, we can solve a lot of the world's problems. While that may not always be the case, I do believe designers contribute to upholding and creating power structures in today's society by developing the systems that mediate interaction between people and infrastructures.

As cities become increasingly digitized, designers play a crucial role in enabling a future where the physical and virtual are intertwined. As a digital designer, I'm interested in understanding the appropriate and responsible use of different technologies in cities and how they affect citizens' interactions. While this applies to many emerging technologies, I'm particularly interested in augmented reality, which many dismiss as a new paradigm for digital interaction or believe to be gimmicky. While I don't necessarily disagree, I do think it is a technology that deserves critical consideration especially as it relates to the field of design.

I believe that design choices are political and have the power to define who can occupy and engage in a space, both physically and digitally. Therefore, designers can play a critical role in shaping which societal issues are brought to the forefront in digital cities, as long as they're involved in the development of use cases for technologies while they're still malleable. I'm motivated to understand how designers can evaluate the political dimensions of including or excluding the application of digital interactions in local urban experiences. By doing so, we can mitigate the risks of technology for different groups of people and create more inclusive and holistic worlds.

To develop a critical framework for understanding the implications of designers' choices, I've built a speculative world of augmented reality. In this world, I've simulated the impacts of designed systems in the urban context. This has given me insight into the role of designers, programmers, and private companies in developing the systems that govern and mediate many everyday interactions between people and the city yet forgo a lot of the responsibility of cultivating a thriving community.

Positioning

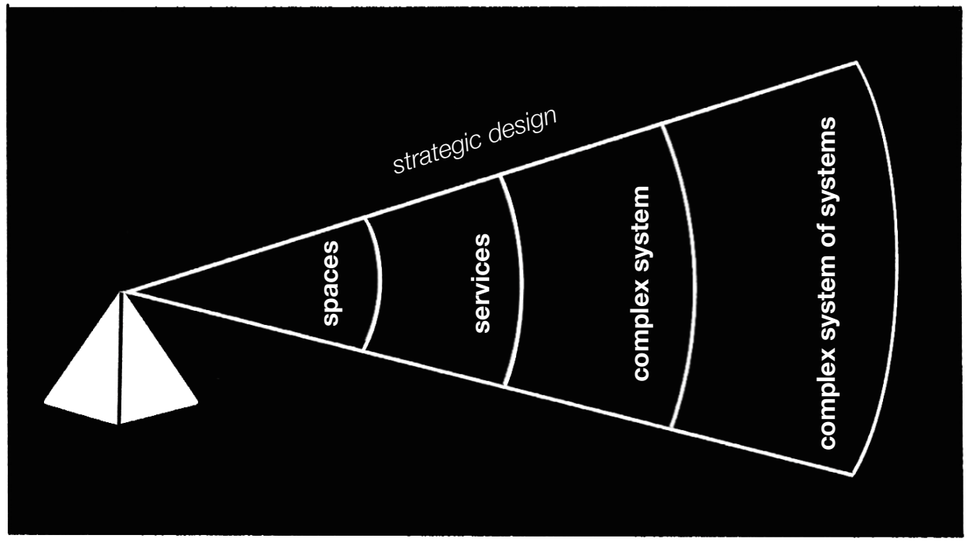
Critically designing the augmented city

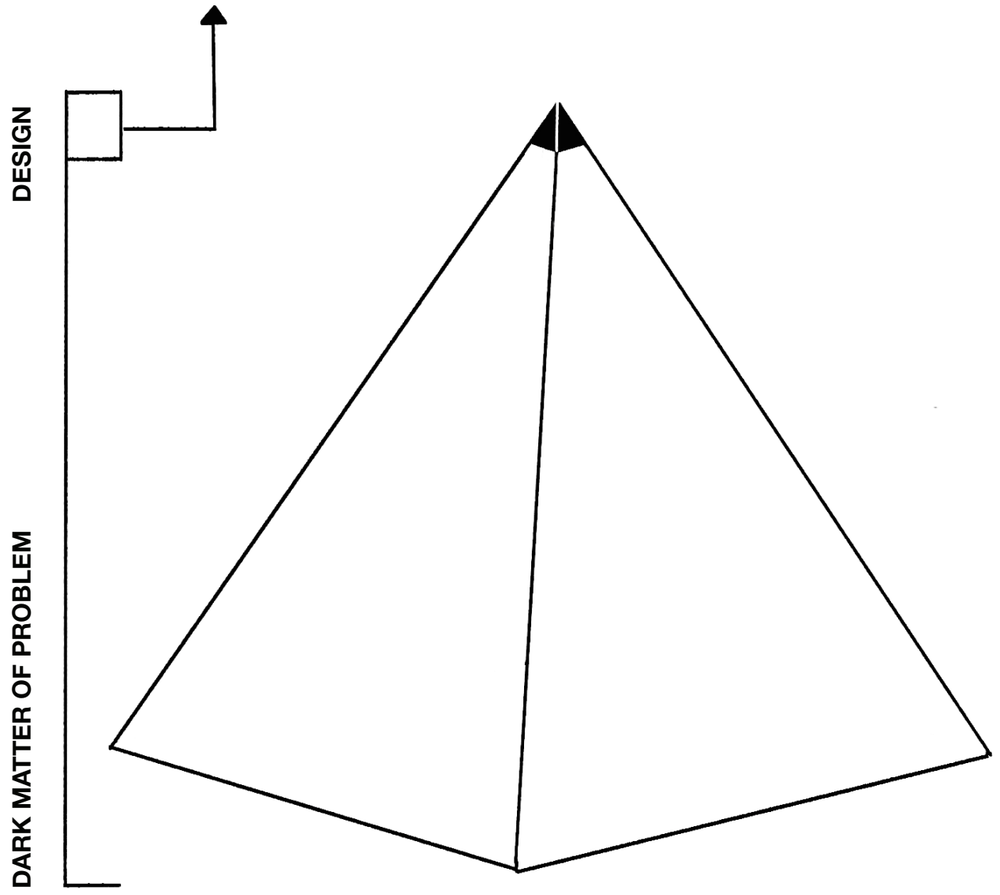
In the context of this project, the augmented city is theorized to become a new digital infrastructure of urban life. While it will take many actors across disciplines to make this future a reality, designers will play a vital role in developing this technology. As we have seen with digital platforms like Uber, Airbnb and Foodora, the interactions dictated by these services have a direct impact on cities and how citizens interact with them. I wanted to take a critical perspective to the impending implementation of an analogous technology that I believe will have similar, if not greater, impact on the urban experience: augmented reality.

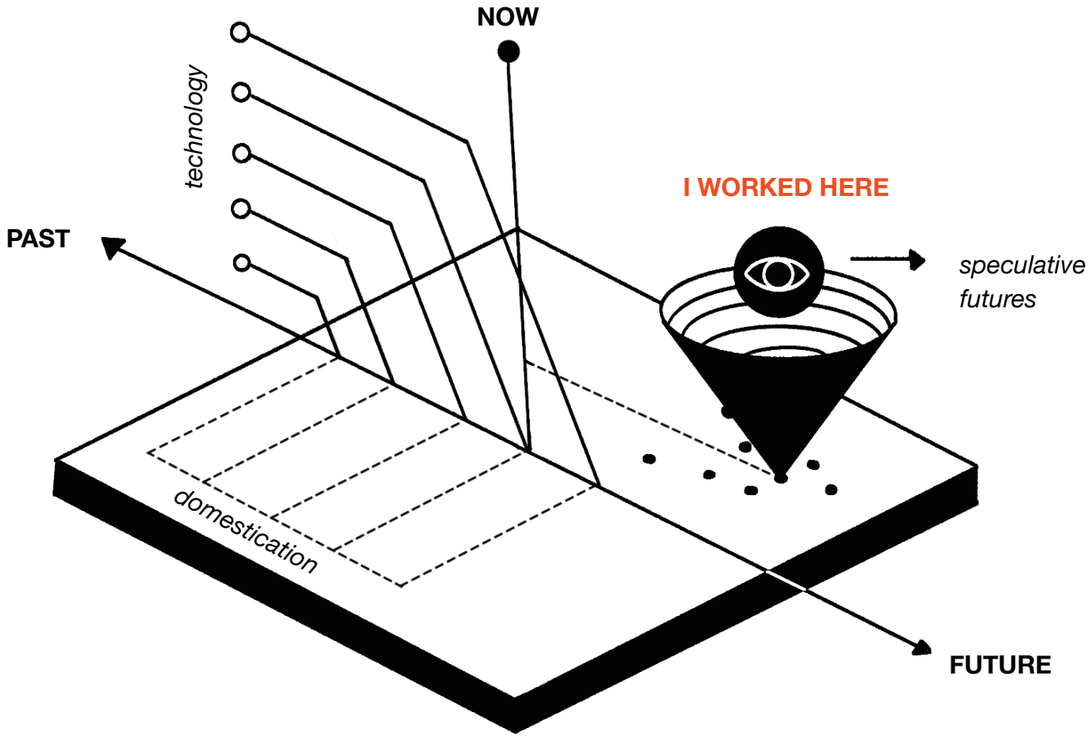
This diploma strategically uses design methods to explore what the augmented city could be. Doing so allowed me to theorize how citizens and their experience could be impacted through a series of design choices for how AR could be strategically rolled out in Oslo. This diploma did not use AR as a means to develop user interactions with this technology. Instead, it uses design methodologies to explore how the experience of AR as it stands as an infrastructure to the future of urban experiences. By visualizing these experiences, I hoped to communicate strategic design interventions that change the outcome of this world.

The project is possibility-driven, highlighting possible approaches that different stakeholders can take to intervene in crafting the impact of this technology in our cities. I did not actively look to solve any existing problems and instead relied on assumptions of future technologies to form the basis of this project. It also incorporates threads of design fiction throughout the project. By using critical theory as the framework, I hoped to guide this speculation in a more directed manner than the typical utopia vs dystopia dichotomy typical of this topic.

I would like to acknowledge the work of Keichii Matsuda and his design studio Liquid City, Lucia Tahan, Alice Bucknell and Space Popular who have greatly inspired the speculative nature of this project. While I hoped to contribute to the discourse on augmented reality, they have actively created work that does this. Though their work greatly influenced this project, I chose to base the project on a theoretical framework that explores a vision of this future that I believe is novel in its application. This approach hopes to create differentiation from their work while still contributing to the overall critical perspective they've established through their storytelling abilities.







"Design has a number of jobs; one is to invent, another is to communicate and third is to **influence**.

Design has this incredible pathfinding role. If we don't embrace this role then the way we construct this future is by deriving it."

Matt Webb in our conversation together

Process

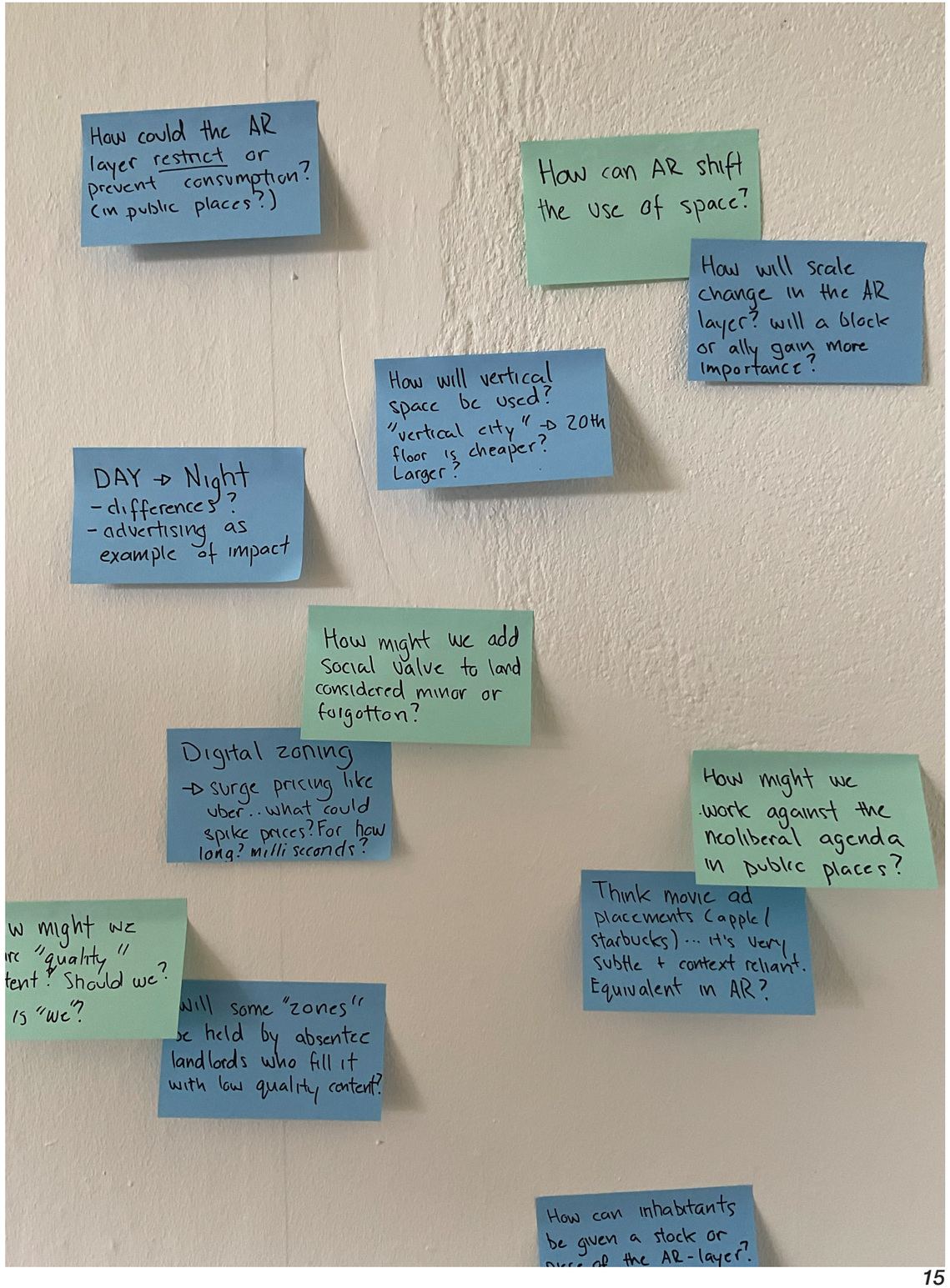
An open-ended, research-driven explorative diploma

The process for this diploma was very open, allowing the insights identified along the way to guide the course of the research and deliverables. This less than linear approach enabled me to explore a range of themes within the greater topic of AR. By doing this, I was able to pull together different threads that resulted in a lens that I felt was unique to the landscape of AR, widening the discourse available on this technology.

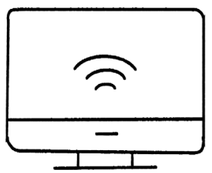
Since strategic design as a formal domain of design is still largely undefined, I took the opportunity to construct my own process for how a strategic design diploma could be conducted. This resulted in a project that wove between research, theory and design practice to inform the progression and outcome of the deliverables. I used strategic design methods such as levers, micro briefs, multiple lenses, and horizon scans to guide my analysis of information synthesis.

The project examined past and current use cases for AR, digital platform structures, and methods of monetization. Based on the assumption that AR will become ubiquitous in urban contexts in the near future, I speculated on possible design interventions that would promote values aligned with my theoretical framework.

The project was conducted in a non-traditional manner to address the broad scope of the topic, and to allow for experimental thinking about alternative ways that this technology could be established as a digital infrastructure. The resulting deliverables serve as a starting point for discussing the potential opportunities and consequences of this future, and how citizens and governing bodies can approach the technology in a preemptive and responsible manner.

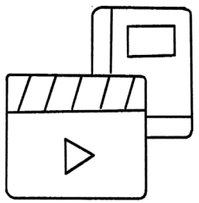


Here are the key methods **used in this project.**



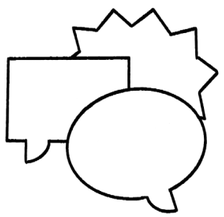
Desktop Research

Market analysis on augmented reality through a range of sources including strategy reports, news articles, recorded lectures, podcasts and even joining discord groups. This was done to develop a foundation of current views on the topic as well as the predictions for its future development in order to later design for it.



Reading. Watching. Listening

Dozens of academic articles and books were used to inform this project. Topics spanned across anthropology, philosophy, geography, computer science and more. Film, television, promotional videos, podcasts and sci-fi books were used as inspiration to understand some of the common narratives depicted through media.

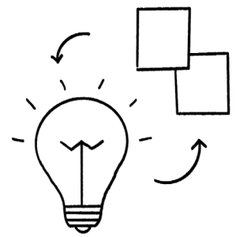


Workshop

I hosted a workshop with a number of participants to help diversify the ideas incorporated in the concept phase of the project.

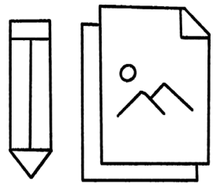
Expert Panel

To contribute to this explorative project, a number of experts were involved to diversify the perspectives incorporated in forming this project. They were selected based on their contributions to their fields, which spanned across a number of fields including philosophy, design, urban geographies and street art.



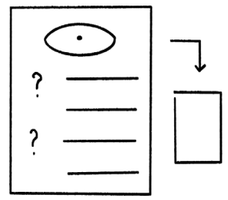
Mapping

Given the vast and complex nature of this topic, several mapping techniques were used to structure information and identify trends and correlations between the insights. These techniques were also applied during the ideation phase.



Ideation

Ideation through sketching was used throughout the project to visualize the different ideas. Tools for ideation were also used to increase the quantity of ideas that stemmed from the research insights eg. crazy eight, Mash-up, Stinky Fish and Unintended Consequences.



Micro Briefs

I created a set of micro briefs that highlight lines of thinking into the “dark matter” of the future AR-layer to help increase the themes covered in ideation. I then made visuals to act as a low fidelity prototype that center conversations with stakeholders about the future of AR and digital rights of citizens.

The goal was not to solve a problem but identify opportunities

This diploma differs from the classic design project as the entirety of its deliverables don't try to solve a concrete problem. Instead, it looks to predict possible opportunities for the implementation of AR in cities as a means of enhancing citizen agency. This is done in response to the speculation that it will likely prohibit, police or exploit their behavior if critical perspectives aren't considered in its design.

My goal was to use strategic design methods throughout the process as a means of exploring the implications of this technology in a way that could benefit citizens and cities on a scale beyond just the individual scope that typically applies to UX. As an interaction designer, I wanted to use my skill set to explore how this new digital paradigm could be to implement in cities. I hoped to challenge the current media narrative by exploring possible repercussions that AR interactions will have on citizens and the city they live in.

This was all in the hope that I could find a new or novel perspective that contributed to the discourse on this technology from the design field and identify a new lens for which relevant stakeholders might be able to approach its use. Rather it explores the popular "right to the city" concept as one of the radical options that could be used to apply augmented reality in a way that centers around the democratic and social values for urban inhabitants.

2

DEFINE

This chapter includes a review of the technology , description of the theoretical framework and the project's scope.

Platform-as-Infrastructure

Digital ecosystems are increasingly an indispensable scaffolding of urban life

Over the last few decades, we have seen digital technologies achieve what Plantin et al. coined as the platformization-of-infrastructures and the infrastructuralization-of-platforms. These global providers have created a market monopoly largely by applying platform services in lieu of, or as an extension of, many infrastructures available to urban inhabitants. By funneling the bulk of wealth and responsibility to private corporate giants, they use their universal platforms to exploit their users for their own gain. With power similar to that of the railroad, telephone, and electric utility monopolies of the late 19th and 20th centuries, monopoly providers like Google, Meta, and Amazon have been able to integrate their services to a point of transforming the built environment of cities to better comply with the needs of their services (Plantin, 2016).

Platforms, at their most basic form, are digital systems that enable two or more groups to interact. They are intermediaries between different actors like users, advertisers and service providers (Srnicek, 2016). Gillespie argues that these companies use the term platform as a way of "positioning themselves as neutral facilitators that downplay their own agency". He reasons that the term is fluid enough to apply to a range of services that could be offered in their ecosystem yet vague enough to deflect the majority of responsibility they have to the people and cities they affect. They position themselves as merely connecting one actor with another. An intermediary and nothing more (Gillespie, 2010).

However, this is far from the truth. Platforms embody a politics. Their owners dictate the rules for its development, governance, market placement, as well as their interoperability with adjacent technologies (Srnicek, 2016). By setting precedents for monopolies, they have been able to create entire ecosystems and achieve control through it's system architecture (Plantin, 2016), while often being beyond the reach of many governing bodies since they can operate anywhere in the world so long as digital interaction can take place (Srnicek, 2016).

In his book "Platform Capitalism", Nick Srnicek believes that digital platforms should be considered an urban phenomenon, as their implementation happens almost exclusively within cities. This has resulted in these technologies becoming increasingly essential infrastructures to daily life, despite the fact that they are dominated by corporate entities (Plantin, 2016). Since infrastructures are "learned as part of membership in communities", the ways in which they exclude or include people are also learned (Plantin, 2016). Digital platforms are not immune to this, despite their stance of offering seemingly universal services. They are often clear examples of how people's need to communicate and attain knowledge are simultaneously stifled and facilitated within profit-driven corporate ecosystems (Plantin, 2016).

*"There is a fundamental shift in urban sovereignty, as technology companies move beyond treating the city merely as a place to extract value from and start thinking of it as also a space to exercise **dominion** over."*

Who owns the future city? by Jathan Sadowski

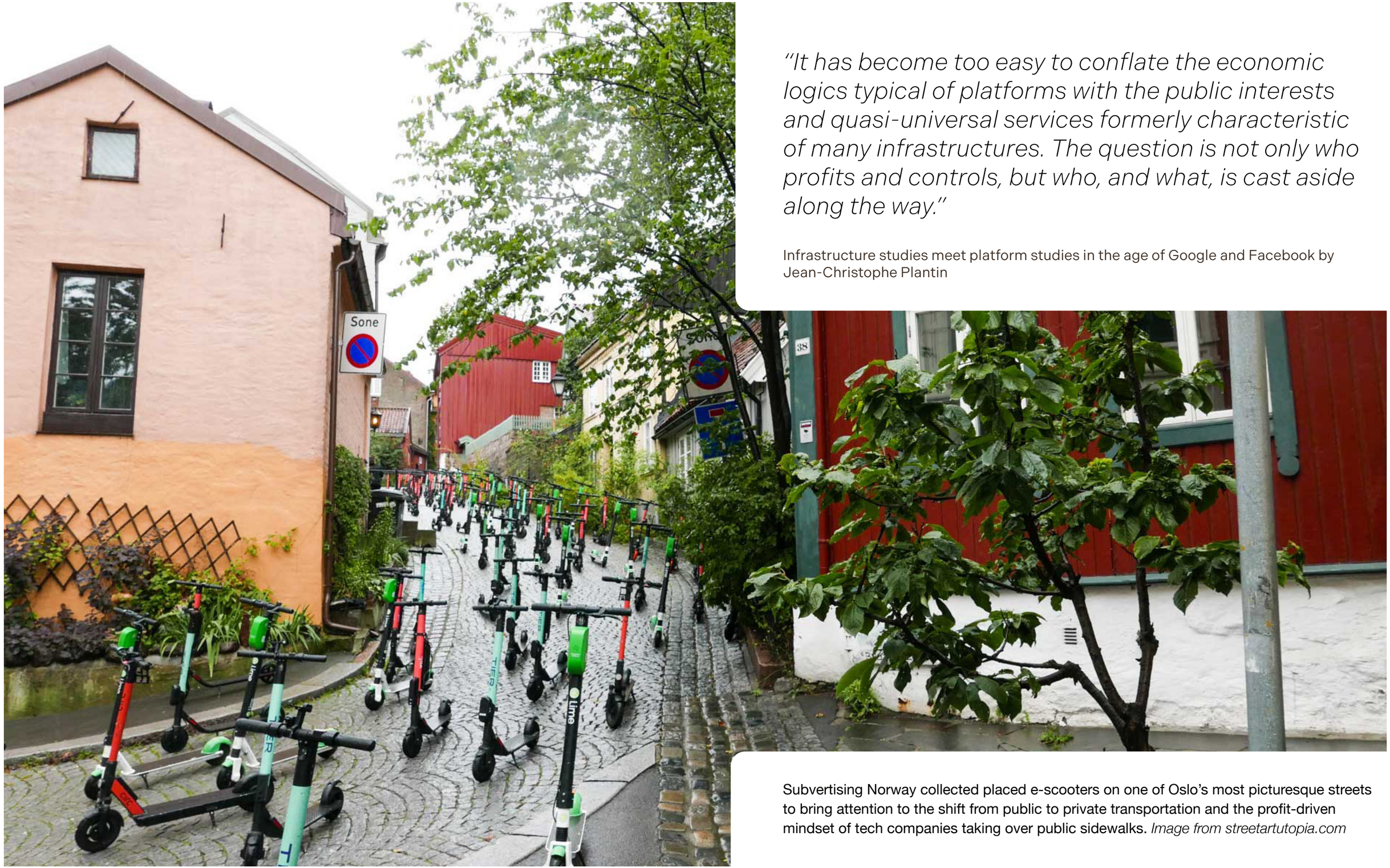
Big Tech is in a race to dominate **the AR-layer.**

Given the potential for exploiting the data-driven and economic opportunities that the AR-layer offers corporate entities, there is substantial evidence behind why they are in a race to develop the hardware and software necessary for implementing an AR experience as a global service (Alcañiz et al., 2022). This capitalist drive is partly why Srnicek believes that efforts should be made to create public platforms owned and controlled by the people, in contrast to today's system of global corporate monopolies. He suggests moving towards platforms beyond capitalism as a means of addressing the impacts of the surveillance state emerging from digital platforms today (Srnicek, 2016). By doing so, we could make platforms for social good while still supporting technological innovation. However, making the switch from siloed platforms to those deemed as public utilities would require significant investment of resources from local governments, which may not be viable solutions today given the vast resources it requires. This will mean there is a need for there to be a meeting point between the two; one that champions technological and creative innovation without violating the digital rights of citizens (Srnicek, 2016).

While the AR-layer cannot currently be classified as a platform-as-infrastructure, I believe it has the potential to become a dominant digital service that heavily integrates and impacts the lives of urban inhabitants. Many actors will contribute to the development and success of this future platform shift, but design will have an integral role in materializing the politics of its provider into a space that should be inherently democratized: public places.

"It has become too easy to conflate the economic logics typical of platforms with the public interests and quasi-universal services formerly characteristic of many infrastructures. The question is not only who profits and controls, but who, and what, is cast aside along the way."

Infrastructure studies meet platform studies in the age of Google and Facebook by Jean-Christophe Plantin



Subvertising Norway collected placed e-scooters on one of Oslo's most picturesque streets to bring attention to the shift from public to private transportation and the profit-driven mindset of tech companies taking over public sidewalks. *Image from streetartutopia.com*

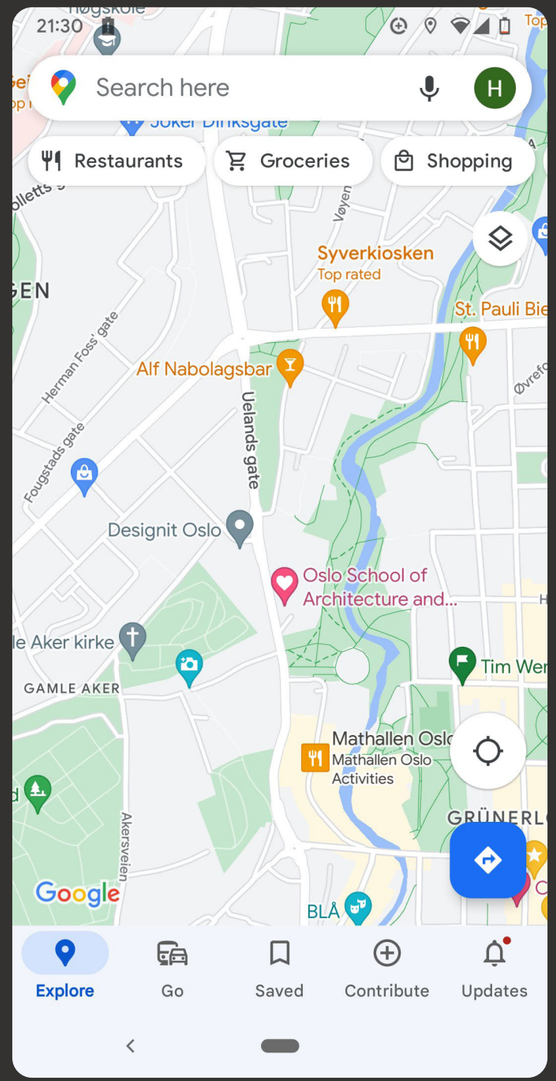
A case study on Google Maps as a tool for acquiring power**.**

Urban inhabitants increasingly rely on digital maps for navigation and their geographic understanding of the world. However, it's not often recognized that these digital representations are not neutral sources of information (Dalton and Thatcher, 2019). As Mark Graham describes in his paper "Augmented Reality in Urban Places: Contested Content and the Duplicity of Code", these spatial representations are biased and reflect existing power relations rather than simply revealing knowledge. Maps tell stories that exert power and pick sides, leaving some voices excluded. They are tools that normalize and legitimize exercises of power as they often produce a sense of place (Graham et al., 2013).

This stems from the fact that it's private companies that creates these services, maps being used as an example of one, that only does so to advance their revenue streams (Dalton and Thatcher, 2019). Therefore, the use of digital maps cannot be viewed independently from consumerism as they are shaped by political-economic processes and exhibited by which features are prioritized over others. Google Maps, for example, is designed to encourage spending in the real world as much as its search function does (Dalton and Thatcher, 2019).

Maps have historically served as a means for those in power to establish ownership and demarcate boundaries. The importance of lines on maps goes beyond just representing the world; they also shape it. Google has transformed maps into programmable objects, with Google Maps becoming a platform that provides access to a vast store of knowledge and information. Yet, as Graham argues, there is no such thing as a completely accurate map. Maps are always selective, partial, and tell a story from a particular perspective. This is particularly true of online maps, where it's bias can be difficult to parse out.

As the digital and physical worlds continue to merge, the use of digital information to navigate and understand the physical world will impact how we perceive it and who dictates what that story is. The AR-layer could quickly work towards not only reinforcing real-world inequalities but also enable dramatically different experiences of the same places. As the augmented city will heavily rely on the 1:1 digital map of the real world, we will need to address not only the inadequacies of our current approach to digital geographies but also what an ideal digital geography might look like.



"Maps are instruments of power.

Those who control the map, shape the world. It is therefore crucial that we all pay more attention to the digital layers that augment our world, and that we ask how those digital layers might come to be defined by self-determination, accountability, equity and justice, and by ontologies of space that allow the world to be open, unfixed and always-emergent."

Geographies of Digital Exclusion; Data and Inequality by Mark Graham and Martin Dittus

What is AR?

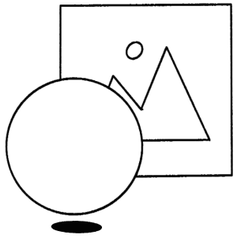
AR adds information to enhance or create entirely new interactive environments

Augmented reality (AR) is a technology that enhances the physical world by overlaying digital information, graphics, or objects onto the user's view, typically through a mobile device or smart glasses. AR can be used to provide additional information, augment the user's sensory experience, or create entirely new interactive environments. Compared to a fully simulated virtual experience like Virtual Reality, AR integrates and adds value to the user's interaction with the real world. It's the context of the physical world that differentiates it from the virtual one. It's a technology that can also be used by multiple users who are sharing the same physical space while interacting with the same virtual content.

AR relies on real-time engines and spatial computing technology to enable the ability to associate location in space. It uses SLAM technologies and the "AR cloud" to help to track a user's body and surrounding objects in space, reorienting via cameras and sensors, and delegating data processing to the cloud to keep the device accessing the AR-layer as light and small as possible (Alcañiz et al, 2022).

For the scope of this project, I only look at markerless AR in the form of location-based content. This was chosen for multiple reasons; firstly this type will have the largest impact on the built environment of cities and how citizens perceive the urban landscape. It will also produce systems of ownership and zoning that will attribute power to its makers. I believe the context and sensitivity of location for AR content is underestimated, and will largely influence the implementation of this technology in cities.

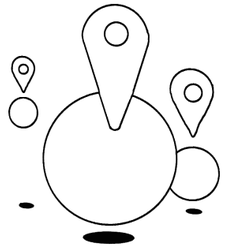
What are the main types **of AR?**



Marker-based AR:

This type of AR uses markers, like images or QR codes, to trigger digital content. When the camera on a mobile device or smart glasses recognizes the marker, it overlays digital content onto the marker in real-time.

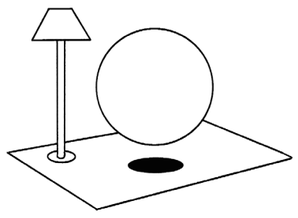
Ex. QR codes



Markerless AR:

Also referred to as location-based AR, it uses location-based technologies to determine the user's precise location and orientation to then overlay digital content onto their real-world environment.

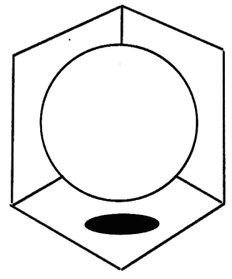
Ex. Pokemon Go app



Projection-based AR

This type of AR uses projectors to display digital content onto real-world surfaces, such as walls or floors. The digital content can be interactive and respond to user input.

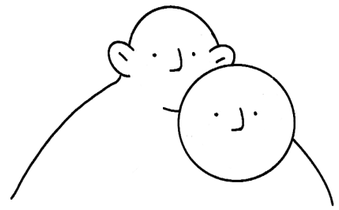
Ex. Magic Leap One



Superimposition-based AR

This type of AR overlays digital content onto the user's view of the real world, but without any interaction between the digital content and the physical world. For example, an AR app could overlay a virtual object onto a real-world scene, but the object would not interact with the physical environment.

Ex. IKEA Catalog app



Face AR

This type of AR uses facial recognition technology to overlay digital content onto a user's face, such as masks or other digital effects.

Ex. Tik Tok Filter

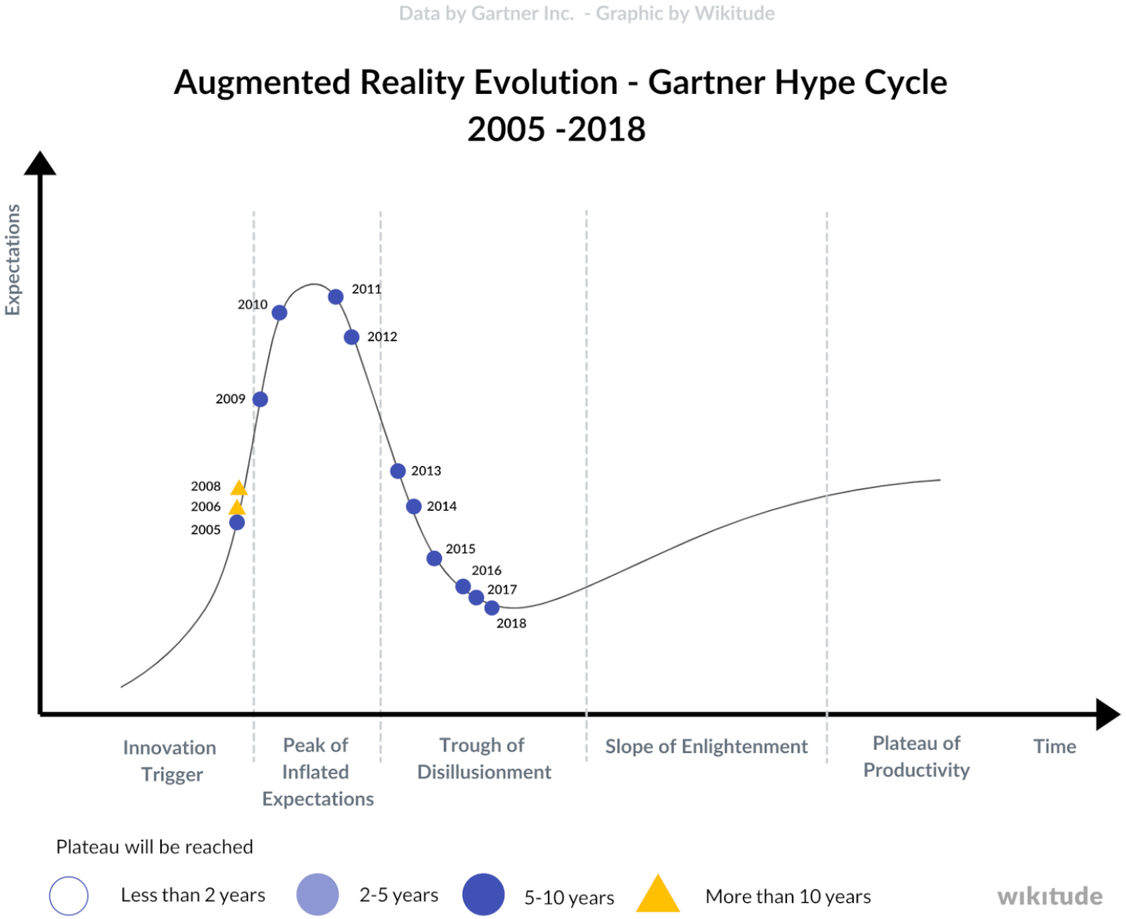
Is AR an emerging **technology?**

When considering its development timeline as a technology, augmented reality has been around for a while. As further evidence, it was fully removed from Gartner's Hype Cycle as of 2018. Although it is not considered to have entered a stage of maturity, it has moved beyond what is considered an "emerging tech" (Herdina, 2020).

This is to say, AR is currently in an awkward stage in its timeline - one where the initial use cases have been piloted both in enterprise and pop culture, however, it has yet to satisfy the software and hardware requirements that would enable it to become a ubiquitous technology. While AR in some forms has become mainstream, for example, Snapchat face filters, IKEA furniture app or Google Lens, many expect it to become an integral part of the digital experience in 5-10 years' time.

Why is this relevant?

That's to say that this technology is still in a malleable stage. The social and cultural contracts, as well as the regulatory approach, have yet to be cemented. This allows us to critically approach how we'd like to preemptively combat any possible consequences. It's widely known that social media has produced many negative impacts on society, such as polarization, addiction, and privacy concerns to name a few. As this technology is expected to become a core infrastructure in society, why not start designing for its impacts now?



Graph produced by Wikitude

AR Cloud

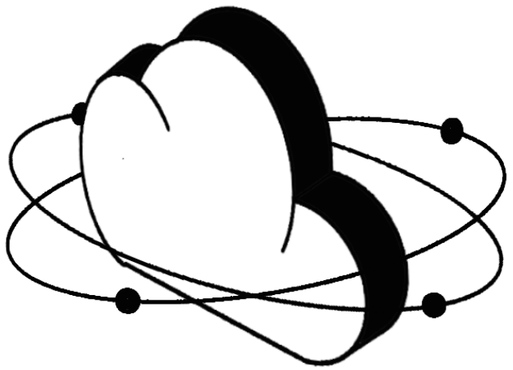
The next step in digital mapping

The AR Cloud, also referred to as a point cloud, is a 3D digital map of the physical world that enables localized experiences in AR. The cloud stores and organizes information about the physical world in order to transmit it in real-time through any AR- capable device (Alcañiz et al, 2022). If the AR cloud is done correctly, it will enable the creation of a real-time dynamic spatial index that is continuously updated by users, meaning the map will recognize when things have changed in the physical world and update itself automatically (Alcañiz et al, 2022).

Advances in geolocation, image recognition, processing speeds, 5G computing, and edge computing have made future AR Cloud developments more realistic (Rodgers, 2023) since devices can now pinpoint locations more accurately than GPS was able to (Verizon). This will allow for AR experiences where every user will see the same content, in the same location, at the same time (Murillo, 2018). However, as the AR Cloud becomes more widespread and ubiquitous, there will be competition among different companies to control and own the infrastructure that supports it. This could lead to a concentration of power among a few large corporations, potentially influencing the types of AR experiences created and distributed.

Different competing AR Clouds could exist simultaneously, each with its own set of apps and functions, similar to content streaming services or video game platforms today (Ray, 2021). Meta has already stated that it will require crowdsourced user data to build its AR Cloud, raising questions about privacy, inequality, and ownership (Pisanu, 2023). There is also a very real concern about companies turning user-generated data about public spaces into a commodity and the prospect of inequality reinforced by geography, where wealthy areas have better AR maps than under-resourced neighborhoods (Pisanu, 2023).

No matter who is first to develop it, the AR cloud will make it easier for users to access and interact with different parts of shared AR experiences. Its development will have enormous implications for the digital world, attributing power to certain actors, similar to how digital maps today are a tool for wielding power (Ray, 2021). This will likely depend on a range of factors, including technological developments, regulatory frameworks, and the choices made by developers, users, and other stakeholders in the AR ecosystem to dictate the distribution of ownership.



The AR cloud could be a digital public infrastructure**.**

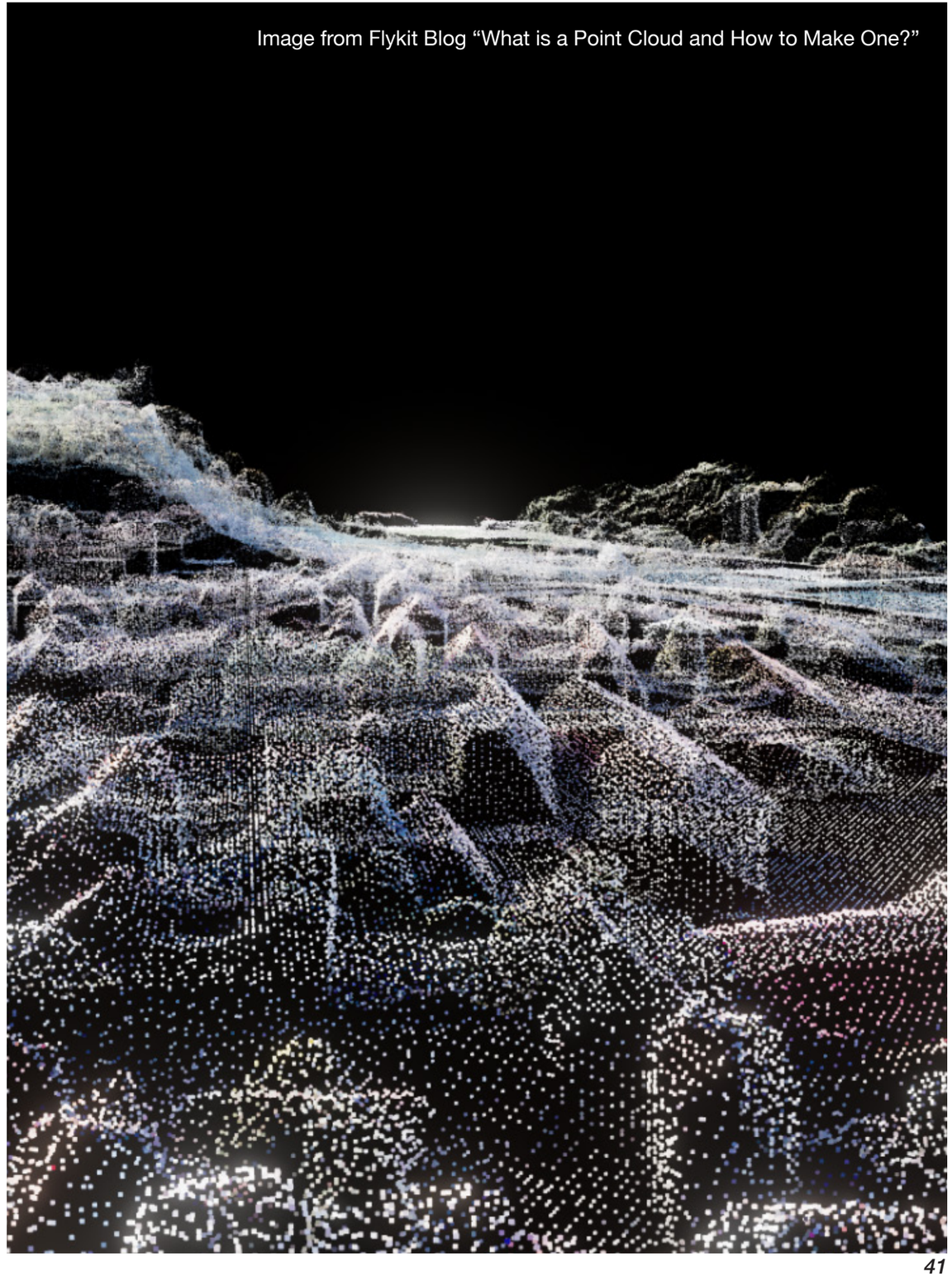
Cities are composed of physical, digital, and social infrastructures that intersect in spaces primarily managed by private corporations (Zuckerman, 2020). As Zuckerman explains in his essay “What is Digital Public Infrastructure?”, entities prioritize financial and market growth over civic values, leading to concerns about spaces that seem public but are controlled by corporate interests. The platforms that facilitate digital life function as siloed, privatized spaces that incentivize charged, controversial, or emotionally stimulating content to increase page views and sell consumer attention to advertisers. This has developed into a surveillance and attention economy that has become synonymous with today’s digital platforms, the same platforms that have been established as infrastructures enabling digital life to function (Zuckerman, 2020).

The centralization of power by large corporations through their platforms has led to the monetization of access to information and the establishment of policies and norms self-governed by the platform owner. The current paradigm has allowed these owners to decide which values their technologies and platforms should operate by. Meaning often their values do not align with public and social good, and should not be considered a public commons (Zuckerman, 2020).

As Catherine D’Ignazio states in an article for The Green European Journal, “they essentially provide public services and a kind of public commons – we could even say a democratic public space – except, of course, it is not public”. Their business models have monetized access to information, whether that’s through subscriptions or through ad placements (D’Ignazio and Klein, 2021). She later states that she believes digital public infrastructure to be a call to action for government and civil society, and to the public more broadly, to claim a stake in what these systems can be (D’Ignazio and Klein, 2021).

As the physical, digital, and social become intertwined, we need to consider whether they should be built on the financial incentives of large for-profit corporations or if they need to balance some responsibility to uphold civic values. Thus, we need to explore new design problem statements that focus on developing spaces that operate with norms and affordances designed around a set of civic values that can generate positive externalities (Zuckerman, 2020).

Image from Flykit Blog “What is a Point Cloud and How to Make One?”



So here's the (soon to be**) issue.**

In 2016, everyone seemed to be outside collecting Pokemon avatars with their smartphones. The spike in online searches for augmented reality, as well as the hundreds of news headlines that year, highlighted the dominance that AR could have in our digital lives. This example was quickly dismissed as gimmicky and not likely to see such popularity again. However, that does not mean it won't.

When evaluating the underlying power structures of the AR layer, I'm not only looking at a single app augmenting one physical location. This project examines the impact of an ecosystem of augmentations, available through private companies that have built the infrastructures to enable AR experiences in every corner of a city, including public places.

As shown through the case study of digital maps and the larger implications of platforms-as-infrastructures, the monopolization of this ecosystem and the AR cloud could result in extreme consequences for the people who use it and the places they live. This is no longer an exchange between platform and user, but should be seen as a possible threat or opportunity for impacting communities on a local and global scale.

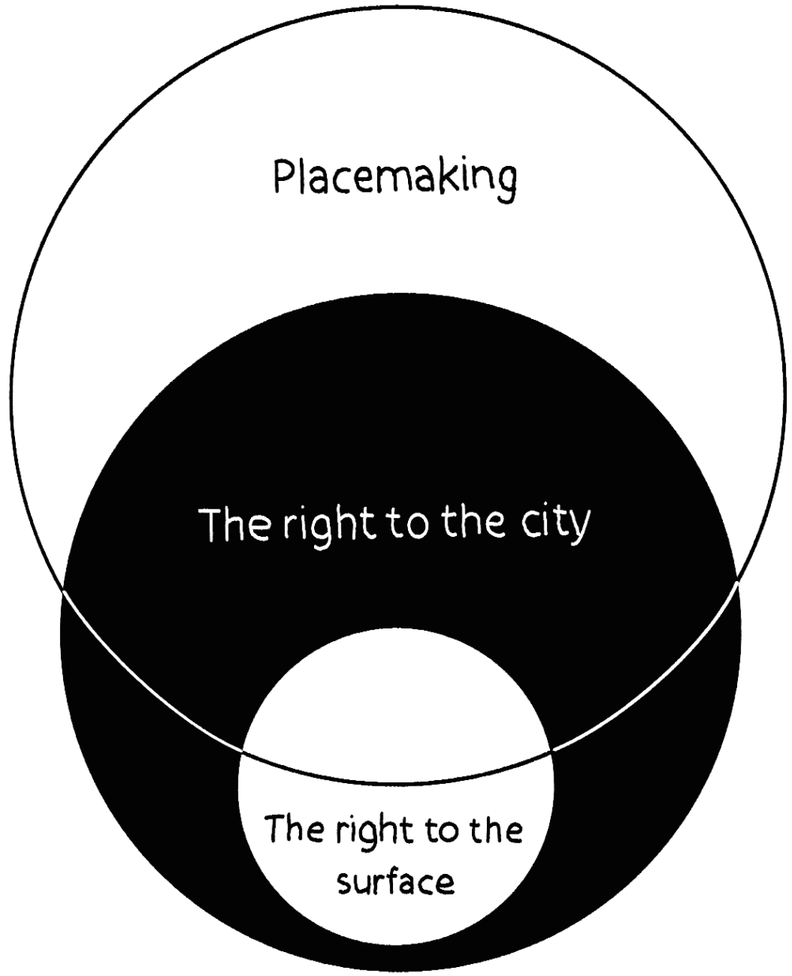
Theoretical Framework

In this section, I will discuss two concepts that form the basis of the theoretical framework used in this project, as well as describe the role that placemaking plays in scoping this diploma. This framework was used to evaluate the research and design phases of the project. The two concepts were chosen for their relevance to the practice of placemaking (and digital placemaking) in cities, specifically in terms of how public space should be created and managed for citizens.

The concepts are:

The right to the city by Henri Lefebvre
The right to the surface by Sabina Andron

This framework led to the core finding of this project: defining the right to the augmented city. This finding was used as a lens to analyze different approaches to how citizens will interact with the AR layer of their city, in a way that highlights the values that stem from the original theoretical framework.



The right to the *city* by Henri Lefebvre.

“The right to the city” is a concept by the sociologist and philosopher Henri Lefebvre. Lefebvre believed that urban spaces should be inclusive, democratic, and accessible to all residents, and not solely controlled by market forces. Instead, citizens who inhabit the space should shape and govern it. This concept is future-oriented and directed towards disadvantaged communities by rethinking access to the city and its resources (Reich, 2020). The right to the city challenges the current definition of citizenship away from nation-state to one that attributes it to the experience of inhabiting the city every day (Purcell, 2014).

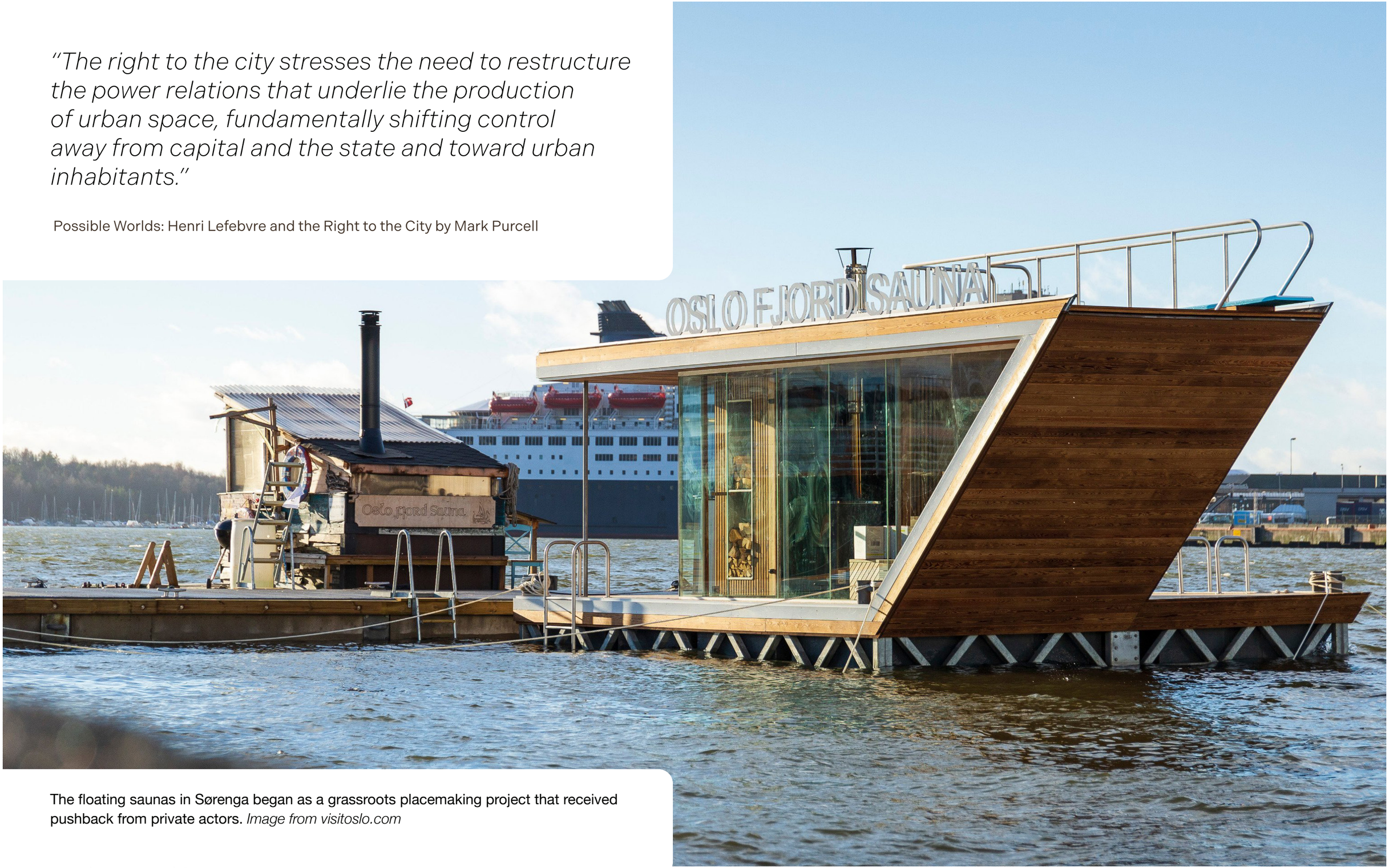
The right to the city consists of two key principles: the right to participation and the right to appropriation. The principle of participation argues that citizens should dictate the decisions that result in the production of urban space. The principle of appropriation refers to the right for urban inhabitants to physically access, occupy, and use space and to produce space to ensure it meets their needs (Purcell, 2002). The concept actively tries to go against the notion that urban space can become private property and in turn commodify urban space.

Property ownership plays an important role in representing the capitalist city as it typically protects property owners through legislation. This results in an imbalance between the use rights of inhabitants in favor of economic exchange value. For Lefebvre, property rights are an expropriation of urban space as it takes what originally belonged to the community and reduces the space in a city as a marketable commodity for consumption. By segregating space into parcels for purchase, it takes what was originally a commons and turns it into something that can be privately owned. As Purcell describes, “the production of space is thus driven by the needs of property owners and capitalism then manages that commodified space in a particular way” (Purcell, 2014).

The right to the city examines this tension and attempts to redistribute power between urban inhabitants and property owners. Although it does not seek to extinguish the rights of property owners, it aims to balance their interests with the social needs of citizens. This would result in the consideration of the social use value of space and ensure any new or existing developments provide an adequate contribution to social needs (Purcell, 2014). Purcell states that this concept was intended to describe a human right, one that should be protected by the governments of the city its citizens inhabit.

"The right to the city stresses the need to restructure the power relations that underlie the production of urban space, fundamentally shifting control away from capital and the state and toward urban inhabitants."

Possible Worlds: Henri Lefebvre and the Right to the City by Mark Purcell



The floating saunas in Sørenga began as a grassroots placemaking project that received pushback from private actors. *Image from visitoslo.com*

The right to the *surface* by Sabina Andron.

Architectural historian and urban scholar Sabina Andron published a manifesto titled “The Right To The Surface,” which exemplifies principles for attaining the right to the city through its surfaces. The manifesto argues that city surfaces are “a concentration of governmental, commercial, artistic, and political imprints that constitute a collective urban identity”. By declaring urban surfaces as an editable commons, it becomes a claim to citizenship and the right to the city (Andron, 2019).

By recategorizing surfaces as a spatial typology different from public or private boundaries, it highlights the importance of “self-determination in the production and occupation of urban space” (Andron, 2018b). This doesn’t only apply to citizens shaping their city through inscribing its surfaces. She includes “the right to touch, read, lean against, write about, and photograph the surface” as a means of enacting civil participation and agency (Andron, 2018b).

Andron argues that cities reveal their political agendas through their surfaces, as the urban surface acts as an ever-evolving archive of the city’s spatial justice (Andron, 2018b). Neoliberal approaches to the urban environment encode places with the passive signifiers of the governing forces behind them, whether that be through signage, anti-graffiti materials, or consumerist messages meant to generate capital for commercial actors (Andron, 2019).

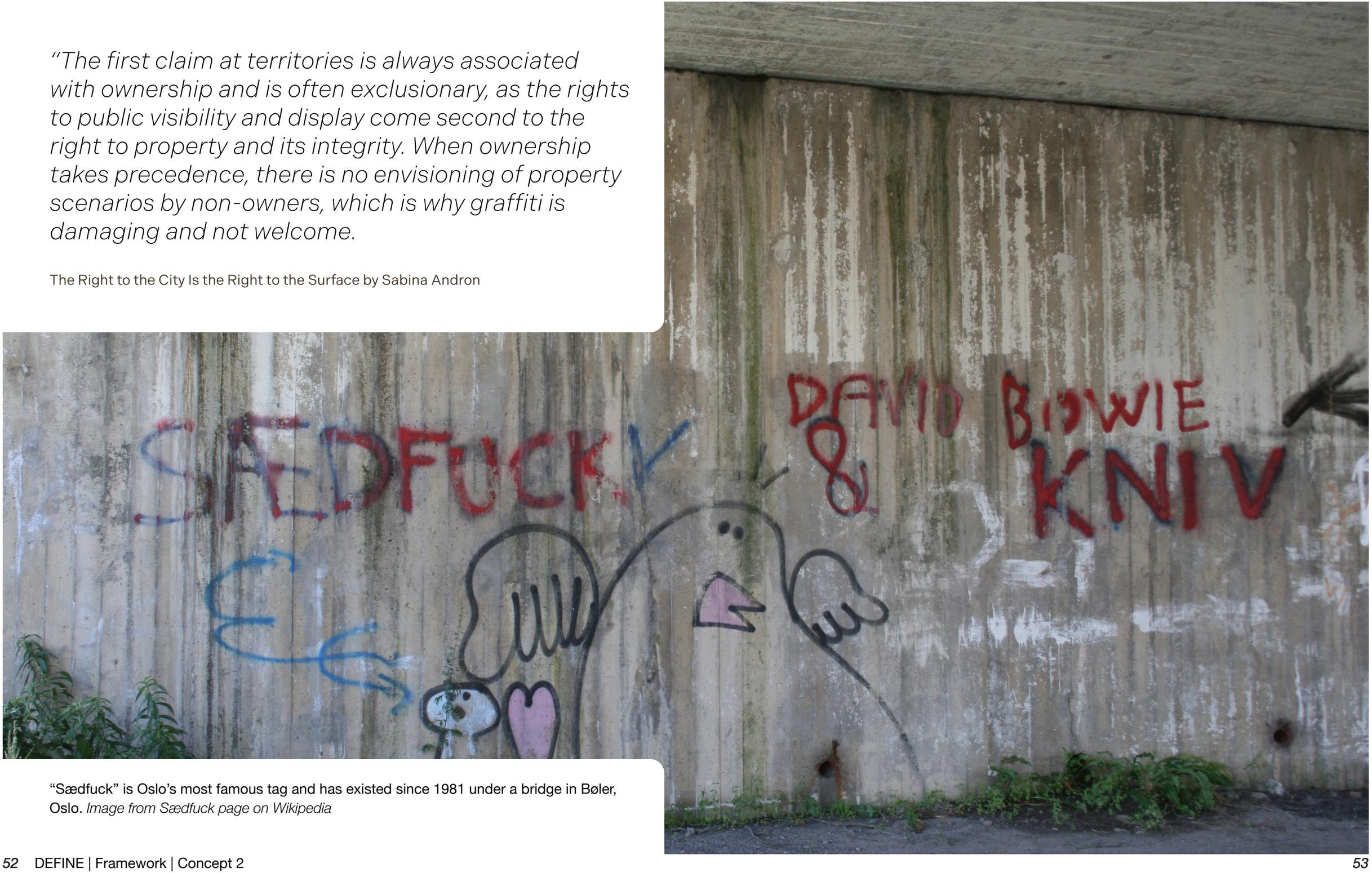
Andron focuses on the distinction between public and private as particularly relevant for this project. Her work argues that our perception of the world is determined by how these two place-types are defined, and more specifically, it influences our understanding of what is allowed, what is proper, and where it is proper. This is because much of this perception is determined by the Western connection between law and space, and how it determines the politics of ownership (Andron, 2019).

Property is an important component of this, as it dictates the parameters of access, regulation, and policing. The urban surface is used as a medium for exclusion by exerting dominance through the criminalization or artification of surfaces (Andron, 2018a). Whether that be through regulations like Oslo’s Zero Tolerance Policy or Street Art Action Plan, it’s done as a method of controlling the image of the neoliberal city.

While Andron refers to the inscription of physical urban surfaces as a means of reclaiming and producing space in a city, I plan to extend this to the digital surfaces. I believe these boundaries in the AR-layer will emit a similar politics, as they will be equally linked to the ownership and control of property as politicized spaces.

"The first claim at territories is always associated with ownership and is often exclusionary, as the rights to public visibility and display come second to the right to property and its integrity. When ownership takes precedence, there is no envisioning of property scenarios by non-owners, which is why graffiti is damaging and not welcome.

The Right to the City Is the Right to the Surface by Sabina Andron



"Sædfuck" is Oslo's most famous tag and has existed since 1981 under a bridge in Bøler, Oslo. *Image from Sædfuck page on Wikipedia*

Placemaking

Using the urban process to scope the project

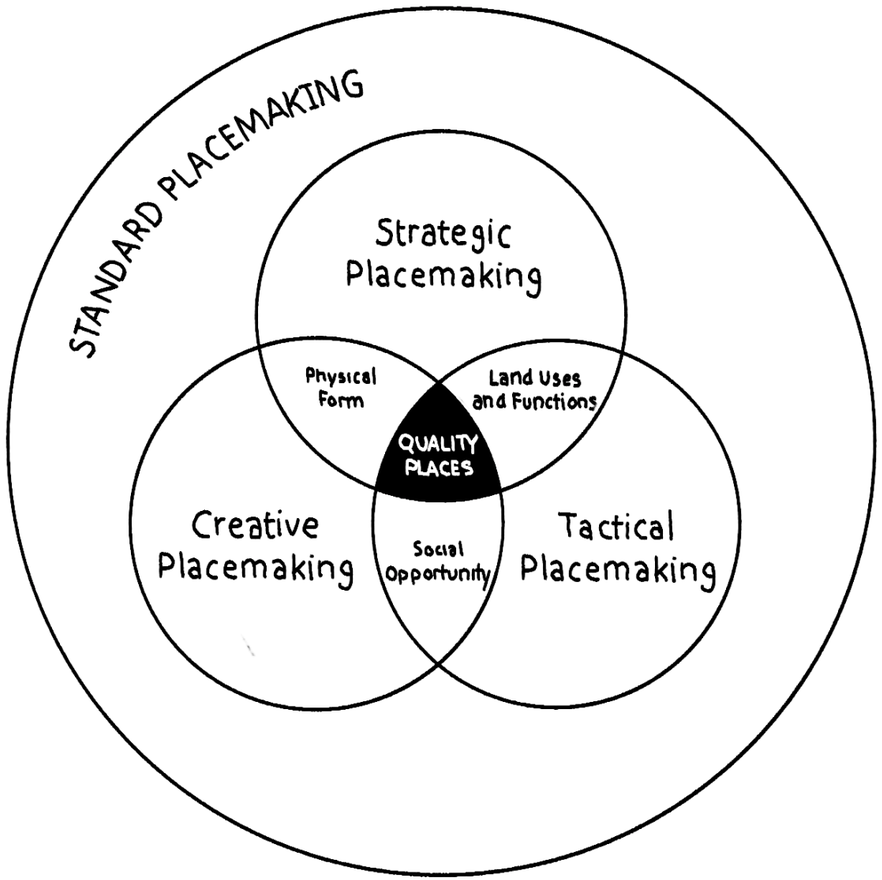
Placemaking is the urban process of creating or improving public spaces so they are functional and improve the opportunity for social interaction. According to the Project for Public Spaces, the goal of most placemaking projects is to create a space that is welcoming, inclusive, and reflective of the local culture. This is done to try to enhance the quality of life for everyone who could inhabit the area. This process typically involves a collaborative approach, connecting municipal actors, architects, urban planners, developers, non-profit organizations, and communities exterting power in shaping place (Reich, 2020).

There are four types of standard placemaking practices:

- Strategic placemaking involves a more intentional, long-term approach to creating public spaces that support specific goals or outcomes.
- Tactical placemaking involves making small-scale, low-cost changes to a public space in order to test out new ideas and generate community engagement.
- Creative placemaking uses arts and culture to engage the community and promote social, economic, and environmental benefits.
- Digital placemaking involves using digital technologies and media to create more engaging and interactive public spaces.

Placemaking is inherently political in nature as it first and foremost places importance on place identity. It aims to transform the underlying and unequal power structures that enable those who are excluded and marginalized to exercise their ‘right to the city’ (Reich, 2020).

Placemaking is used as a method of scoping for this project for three reasons: it is limited to public places in cities; it attempts to realize use of spaces that result in social good for the community, and it is an urban process that connects a range of stakeholders. I plan to use placemaking principles to explore how augmented reality can be realized in cities to help keep community-centric initiatives at the forefront.



" You need placemaking because otherwise the capitalist imperative is just going to be to build bigger buildings."

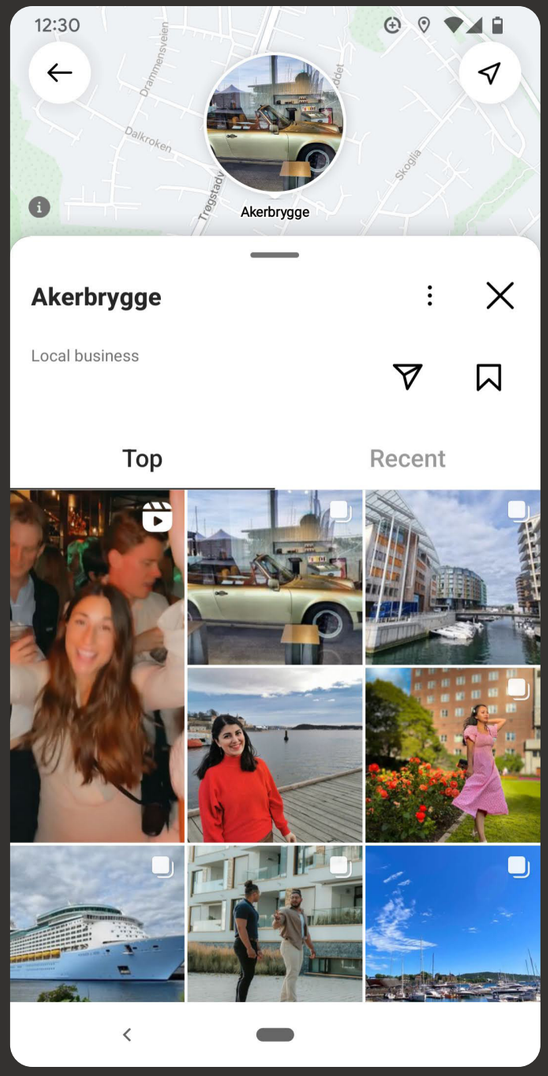
Matt Webb in our conversation together

Broadening the scope of digital **placemaking.**

Digital placemaking is the use of services and technologies like social media to encourage more public participation and collaboration. It incorporates grassroots efforts from local communities as well as uses digital media to enhance social engagement, storytelling, and place discovery. The overall goal of this type of placemaking is to use digital media to cultivate a sense of place (Halegoua, 2020).

Digital placemaking involves the integration and strategic use of technology to support traditional placemaking practices and strengthen community connections in public spaces. This can look like urban screens, interactive installations, social media strategies, and projection mapping.

Although digital placemaking is an established component of placemaking, its scope is limited. Urban planning generally overlooks the impact of digital platforms and services. Once the augmented city becomes integral to urban life, digital placemaking will need to broaden its scope to include the emerging AR- layer as a new dimension of space. This is because the AR ecosystem appropriates public space and influences its potential uses all the while bypassing standard governing institutions.



Should there be a right to the AR-layer **of a city?**

Establishing Lefebvre and Andron's concepts around the right to the city, I would like to explore the possibility of extending these concepts to a digital layer of information anchored to real-world locations, otherwise known as the augmented city. If this technology becomes integral to the daily life of urban dwellers, this emerging layer will inevitably have externalities that impact how public places are perceived, interacted with, and used.

These concepts were chosen as they provide an alternative perspective to the narrative that is frequently put forth by pop culture and private enterprises exploring this future. This narrative is heavily exemplifying capitalist and neoliberal ideals. The theoretical framework was created to take the common themes in both concepts and apply them to the AR-layer to examine how the augmented city could inhibit or encourage citizens shaping their city. The core themes of the concepts deal with the rights attributed to property owners, expanding the qualifications that define citizenship and challenging the ways citizens claim agency in their cities. These themes will play an important role in creating and managing the augmented city, as will the approach of Placemaking.

I believe this will be critical in evaluating how the AR-layer is implemented into cities as the profit capabilities associated with AR will create financial incentives for big tech to dominate this space, dictating the frameworks and values embedded into the public places of cities. If the digital layer is recognized as an influencing factor in the production of space in the urban context, it will directly impact citizens and their right to the city.

It's only a question of how we allow it.

How can design challenge future power structures associated with location-based digital content in cities in a way that creates value for citizens?

3

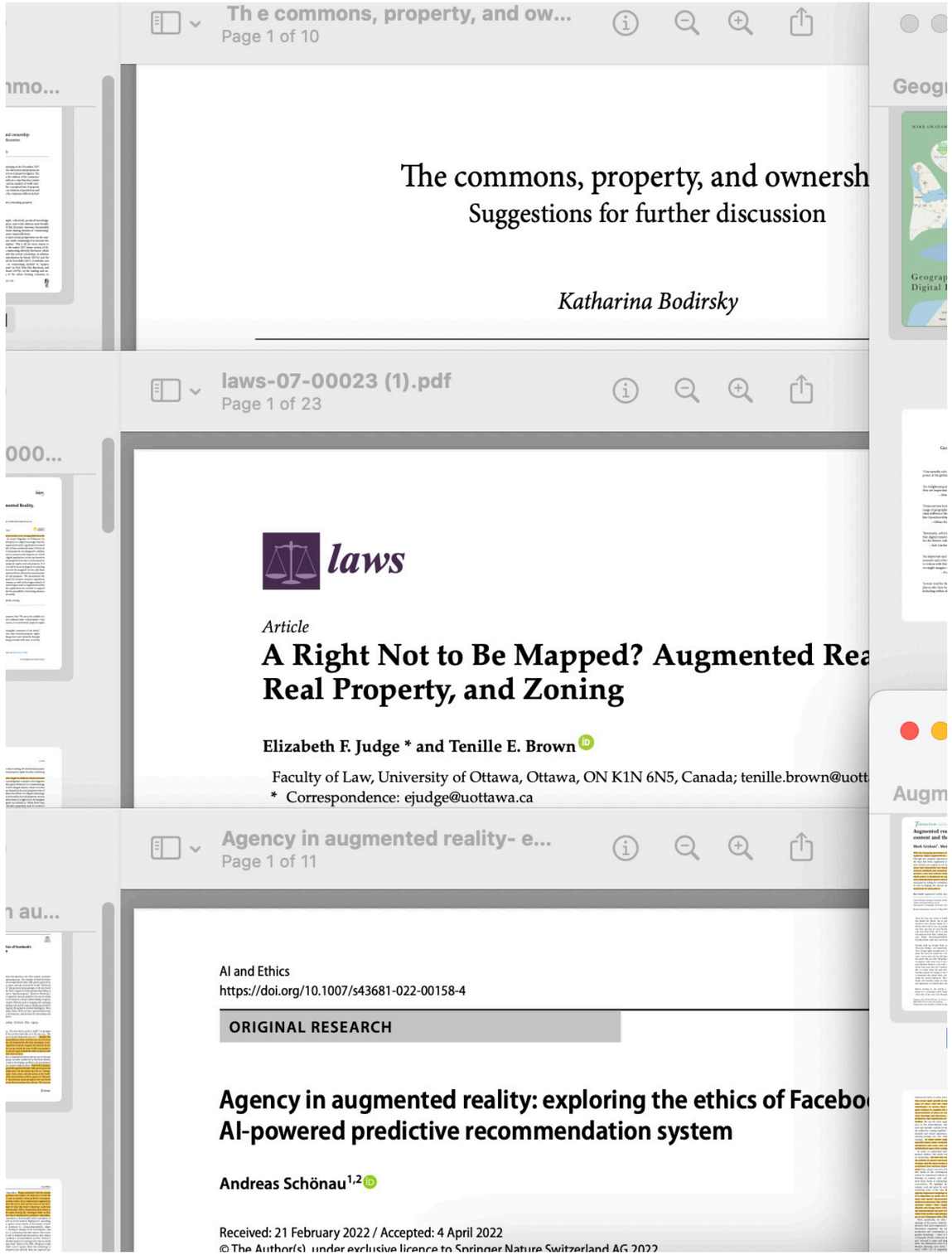
RESEARCH

This chapter covers the types of research methods that were used as well as the main findings. The question "How could AR be implemented in cities" was the basis of the research, reviewing pop culture, academia and corporate narratives.

Read 50+ papers.

Academic articles and paper

During the project, I researched the topic by reading numerous academic articles to better my understanding. To ensure a balanced approach, I sourced papers from various disciplines, avoiding over-reliance on a single perspective. While some articles were used to provide a general understanding of a topic, others were used for detailed notes. The extracted insights were added to a larger giga-map and correlated to identify key trends. Ultimately, these insights were synthesized to help inform the main themes of the project.



Augmented Reality, Augmented Ethics: Who Has the Right to Augment a Particular Physical Space? by Erica Neely

While these areas are all worthy of further discussion, in this paper I will be focusing on questions pertaining to property and ownership. Specifically, I will address what ethical rights we have to augment or prevent augmentation of particular physical spaces. I am certainly not the only person to discuss this. Wolf, Grodzinsky, and Miller (2015) raise the question of whether someone should be able to own the visual experience of a public place or if there should be some kind of limits to augmentation. Brian D. Wassom (2015) has an excellent discussion of the legal issues surrounding this kind of augmentation, though much of it is speculative as the technology has not progressed far enough to be certain what legal precedents will apply. Brinkman (2014) addresses augmented advertising, particularly advertising which is designed to be offensive or annoying in order to coerce nearby residents to purchase the physical property (and thus remove the advertisement.)

Fundamentally, the nature of augmented space both supports the idea that we should have some ethical rights over the space and makes determining how that should work difficult. On the one hand, we recognize rights over both physical property and virtual space. Since augmented reality is a blending of the physical and virtual realms, it seems unlikely that these rights would completely disappear. On the other hand, the very nature of augmented reality complicates the notion of rights because it is not clear how to translate them into augmented space; the rights we have recognized in physical space and virtual space do not entirely line up.

a. The connection to physical and virtual property

In most ethical theories we recognize some sort of rights over physical property. There are, of course, multiple ways of justifying this claim, depending on whether we take a Lockean view of property as a kind of natural right (Locke, 1689/1988) or a more contractarian view of property as arising from social agreements. (Rousseau, 1762/1997) Nevertheless, we generally recognize that depriving someone of their own justly held property causes a harm; similarly, interfering with the use of their property also causes a harm. Unless there are extenuating circumstances, I should not take your pencil, nor should I coat it in grease so that it is impossible to pick up and use. In both cases I would be interfering with your own reasonable use of your property.[8] This is also the case with respect to property rights over a particular space; I cannot ethically interfere with someone's use of their home unless I have some kind of reasonable cause.

Similarly, we recognize certain rights over virtual space and property. For instance, if you have a website you have certain rights to control its content; if your website is hacked and someone posts content that you do not like, you have a right to delete that content. This is akin to having a physical space such as a backyard – someone may throw trash into the yard, but you are not required to preserve it. Similarly, if someone posts spam on your blog or hacks into your website, you are generally not required to preserve what they have done. In both cases the "space" (whether physical or virtual) is something you can ethically restrict the use of.

[8] Note that there could be circumstances where these actions are ethical; I could confiscate your pencil if you refuse to stop filling out an exam paper once the time has expired, say, and that would likely be ethical. Similarly, if I knew some maniac was going to shoot the next person who wrote a sentence with that pencil, it would probably excuse coating it in grease to prevent you from being shot (although this is likely not the most efficient way of preventing this occurrence.) These would both count as extenuating circumstances.

Geographies of Digital Exclusion: Data and Inequality by Mark Graham and Martin Dittus

doing computing, where they are doing it, and, thereby, what computing means both epistemologically (that is, in relation to knowing) and ontologically (that is, in relation to being)'. This means, explicitly looking at dimensions of difference and how they relate to power inequalities. What is needed, in other words, is a postcolonial approach to digital geographies.[1]

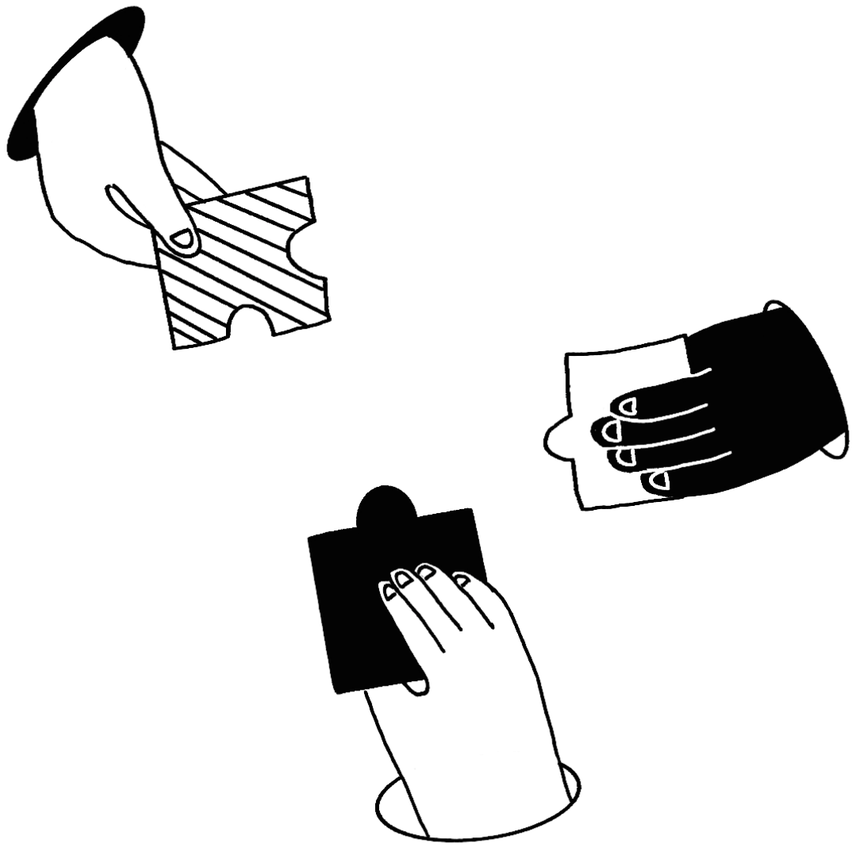
Regulating 'digital spaces'

The regulation of land has often been used as a way to protect the moneyed classes and to further the interests of capital against those of labour. This included the forcible eviction of people from land in some places in Northern Europe, Scotland and the infamous case of enclosures in England and Wales. Here a series of laws passed between the sixteenth and nineteenth centuries (culminating in the parliamentary Enclosure Acts) allowed previously commonly held and commonly used land to be enclosed and privatised; thus dispossessing many of historical rights and access. Conversely, a lack of regulation might also reflect a surrendering to the power of dominant actors like Google who simply reshape the world as they see fit. As such, we briefly consider three types of regulation that could be developed to help bring about more just digital geographies.

What follows are, of course, speculative proposals. Our goal here is less to provide a roadmap for how such regulation could be constructed and more to show that regulation could be deployed to "shape transformed relationships between people and the digital geographies they move through, interact with and bring into being."

First, it is worth considering how Nordic 'right to roam' laws could be reimagined in the contexts of digital geographies. These regulations differ by country, but generally give people the right to access and traverse all private land that isn't in the immediate vicinity of people's homes. In practice, these laws fundamentally change what it means to own private property. Irrespective of who owns land, everyone has access to almost everywhere. As we make clear at the start of this book, there is no such thing as a digital space. There are, however, digital layers of

1. The pioneering work of the Whose Knowledge? organisation is worth noting here. Their mission is to find ways of centring the knowledge of marginalised communities (in other words, the majority of the internet).



Insights

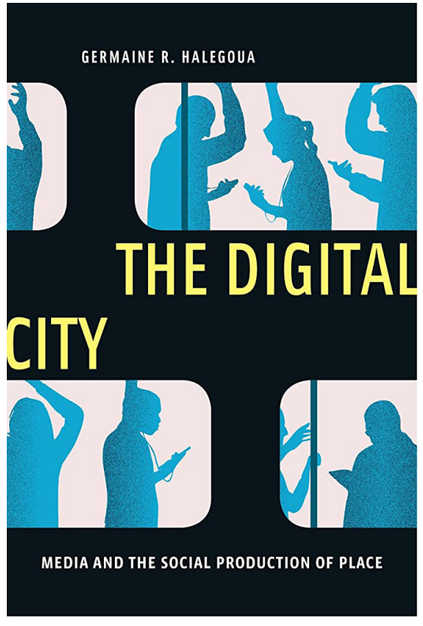
Key points pulled from the academic papers

- Public actors have started to realize the impact of commercial surveillance economies and moving towards initiatives for more sustainable advertising based models
- AR is a persuasive technology that attempts to change changes user's behaviors through immersive experiences, by changing how they see, expect, interact with and experience the world
- Digital platforms increasingly influence perception and sense of place
- Major ethical concerns around what data on users are collected in AR, how that data is used and who is designing the application (and paying for its design) in the first place
- AR will majorly impact property and ownership in the real world
- The organization of space is political and the design of it's governing principles produce radically different 'sense of place'

Flipped through books.

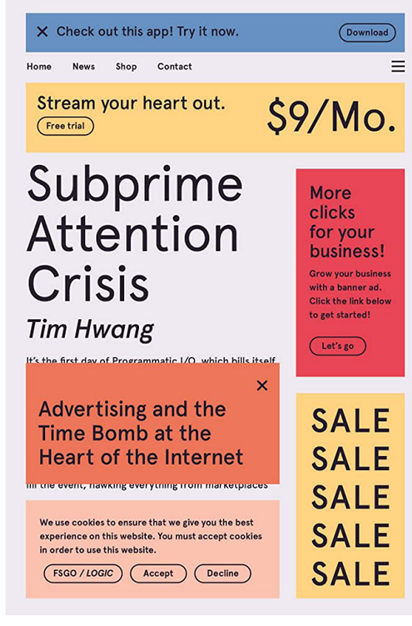
In-depth topic review

I wanted to learn more about the structures of digital platforms today and how they relate to cities. To get a more holistic view of this, I chose a number of books that would give a thorough overview of the topic. Each book largely contributed to one or more elements of this project like digital infrastructures, the attention economy and strategic design methods.



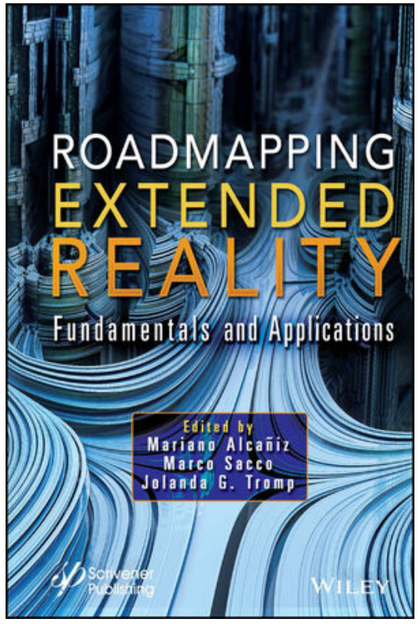
"Our experiences of infrastructure orient and position people within social hierarchies and political and economic structures as well as orchestrate interactions and access to information."

The Digital City by Germaine Halegoua



"This path for funding the web has had major implications on the development of the technology itself. Core services like online search and social media are available free of charge in large part because advertisers underwrite the costs of developing them. The basic building blocks of our present-day experience of the web—from the "user profile" to the "like"—allow advertisers to more effectively target messages."

Subprime Attention Crisis by Tim Hwang

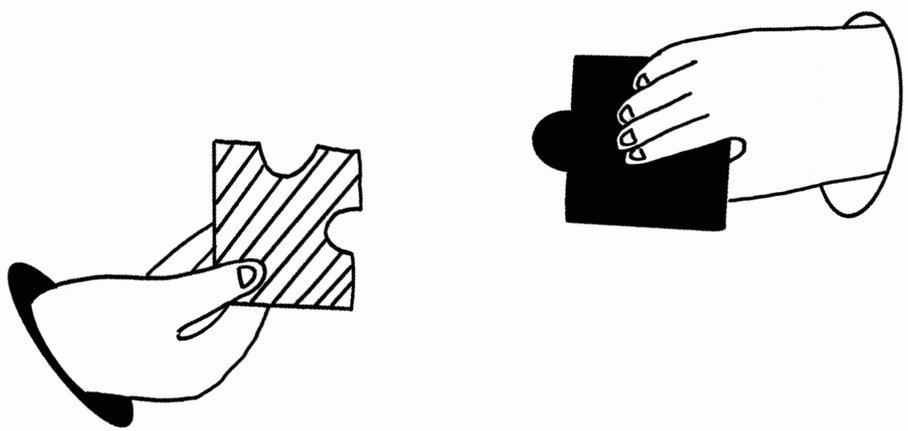


"The overarching challenge is to digitize every centimeter of the world, semantically attribute it, and make it open, easy, and accessible. A digital scan of the real world needs to happen and will happen as part of the XR metaverse."

Roadmapping Extended Reality by Mariano Alcañiz, Marco Sacco and Jolanda Tromp

"In their position as an intermediary, platforms gain not only access to more data but also control and governance over the rules of the game. The core architecture of fixed rules, however, is also generative, enabling others to build upon them in unexpected ways."

Platform Capitalism by Nick Srnicek



Insights

Key points pulled from the books

- Walled gardens is the most likely approach from a handful of controlling companies
- It will take a huge amount of resources from many stakeholders to develop infrastructure needed for decent AR experiences
- Data economy and advertising models will most likely translate to AR in cities (and already is)
- There will be cross over between digital ecosystems more than there is today
- Platforms are becoming infrastructures without the oversight from societies they impact
- Maps are tools of power, and AR will be completely dependant on maps

Watched content.

Analyzing media

Science fiction plays a large role in shaping our expectations and narratives around augmented reality and how it'll impact society. I found a variety of videos, from science fiction to expert ted talks and even promotional videos from technology companies all referencing the future use of AR.

While watching these videos, I asked the following questions; what are people saying, what's the tone it's being written in, whose perspective is being highlighted? Where is this being placed? What themes are emerging?

Lightship Visual Positioning System for AR – Niantic

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NUART PLUS 2016 - DAY 1 - Who has, or should have, the 'right to the city'? wtih Peter Bengtsen

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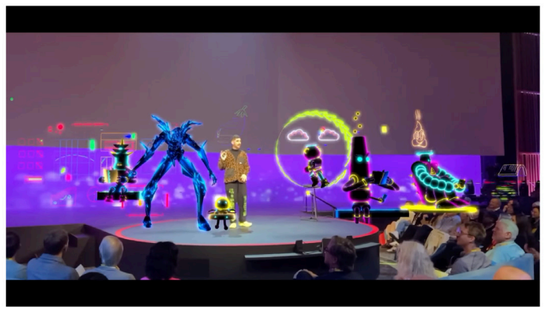

Everyone can participate in building the metaverse | Sutu | TED

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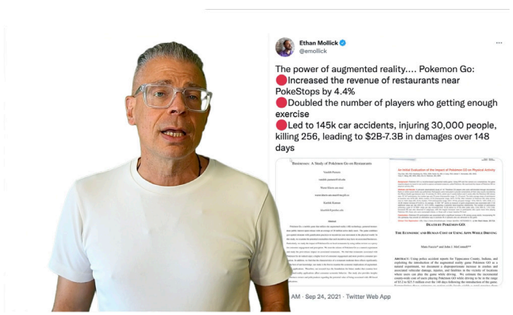

VR Day "The AR Dilemmas" 21 November 2021

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Merging Realities: Connecting the Metaverse to the Physical World

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SpacePopular
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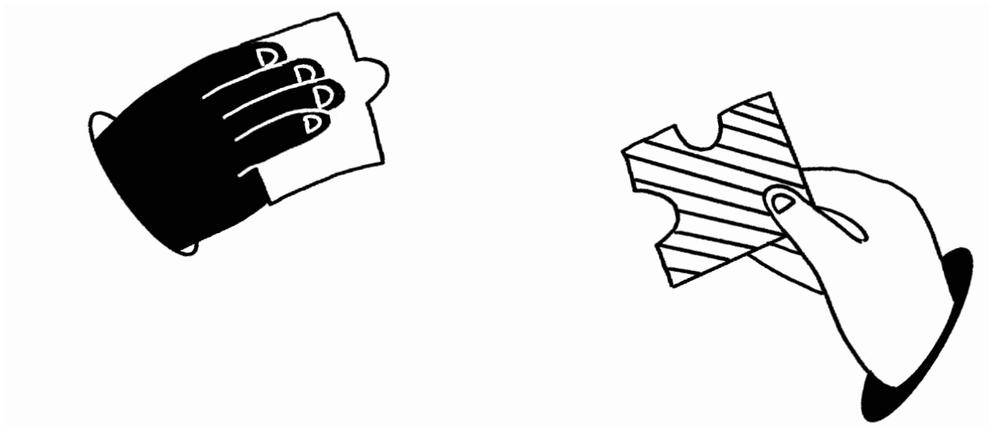


Insights

Key points pulled from media

- Companies are working towards building a 1:1 map of the world (and owning it)
- Companies are piloting AR experiences via navigation and art as seemingly accepted use-cases of this tech.. while skipping over important social, ethical and legislative issues
- There’s a shift from user-centered design to society-centered design esp. for cities
- AR is theorized to have an equivalent ecosystem to the metaverse that augments objects, people, places and buildings (interiors and exteriors)
- There are two dominant sides for how the “AR-verse” will come to light. One from big tech and the other from people rooting for a decentralized approach

Talked to people.

Expert Interviews

To support the desk research conducted for this project and incorporate diverse perspectives into shaping the augmented city's impact on citizens, I interviewed five experts from various disciplines. Some interviews were conducted in person while others were conducted via digital calls.

1 ***Cody Turner***

Philosophy | Ethics | Technology

2 ***Matt Webb***

Design | Technology

3 ***Clara Julia Reich***

Sustainable Consumption | Urban development | Placemaking

4 ***James Fincane***

Street Art | Graffiti | Ad-busting

5 ***Emma Arnold***

Urban & Human Geography | Street Art | Advertising

Talking with Cody Turner

Turner is currently a postdoctoral research fellow at the Notre Dame Technology Ethics Center in the United States, researching the ethics of emerging technologies like augmented reality and artificial intelligence. He earned a PhD in philosophy from the University of Connecticut in June 2022 after receiving a BA in philosophy from the College of William & Mary.

I reached out to Cody after reading his paper titled ‘Augmented Reality, Augmented Epistemology, and the Real-World Web.’ During our two-hour video call, we delved into the topic from the perspective of his expertise: philosophy and ethics. Turner challenged some of my pre-existing assumptions about this technology and offered a variety of unique and interesting examples of possible ethical and philosophical violations that could arise in a future with ubiquitous use of AR. He was the only person I spoke to during this project who had given great thought to this speculative future and theorized about its potential impact on society. Our discussion not only provided me with valuable insights but also highlighted the relevance of this topic and the critical role that design will play in shaping it.

> *I think it’s extremely important to start thinking about the logistics of [augmented reality] now because there hasn’t been a lot of work on this so really it’s kind of a novel conceptual intellectual territory. I think you’re getting in on the ground floor.*

We talked about..

- The importance of interoperability in determining who, and how, different actors could monopolize the AR space
- If augmentations should be viewed as speech or as graffiti
- The lack of financial incentive for Big Tech to self-regulate and the probable importance of public pressure campaigns in the augmented city
- The global coordination problem with regulating technology
- Difficulty of internet censorship and setting guidelines that are contextual to different geographies
- The possible illegal or malicious use cases of a 1:1 map of the world accessible through VR

Talking with Matt Webb

Matt Webb is a technologist based in London known for co-founding the design studio BERG, his work with the Google AI group, and more recently the launch of his boutique agency Acts not Facts working with innovation, strategy, and future trends.

Webb is a frequent guest at AHO, from providing critiques on student projects to giving a lecture on the history of computers. Through his “Unoffice Hours” program, I had a digital meeting with him where we discussed my project for 30 minutes.

Matt helped guide the project’s scope by suggesting that I consider the impact I wanted the project’s outcome to have on its viewers. He also recommended that I focus on tangentially related impacts that the AR layer could have, as well as examining existing examples of advertising in cities.

> *As long as you’re speculating, the awful, speculations are just as valid and they will get people thinking.*

We talked about..

- What the protest documentation is for the augmented city, how will people rebel against it and the type of interfaces used for complaints
- How would the government signify approval for certain technologies in public space and how they police any defiance against it
- If installing an ad-blocker on head mounted AR glasses in public transit could be synonymous to riding the metro without buying a ticket
- The social contracts that emerged with camera phones, and taking photos of other people in public space to be later posted online
- Comparison of owning a web page on the internet, and dictating who is allowed to see what and it’s equivalent to AR
- Outernet installation in Tottenham Court Road, the colonization of public space by private enterprise and the unquestioned integration of ads

Talking with Clara Julia Reich

Clara is currently doing a PhD at SIFO (Consumption Research Norway) on consumption research and digital consumer rights after previously interning at Nabolagshager and working at Placemaking Europe.

After reading Clara's master's thesis on critical placemaking perspectives in Oslo, I reached out to her. Her work stood out to me as one of the few that offered actionable methods for applying a critical lens to the popular urban planning process. I met with her at her office in Bislett where we discussed specific questions I had prepared about her thesis. Clara's wealth of knowledge, stemming from her background in researching and working with placemaking in Oslo, proved invaluable to me. We primarily talked about themes present in her thesis that I felt could be applied to the augmented city, which centers its system design around uplifting citizens and their right to the city.

> *The right to the city is a future oriented approach, looking especially at those people who don't yet or not fully have the right to shape those public spaces. So, it's a lot about like looking at inequalities of power systems and also creating a space to rethink our economic system and the way society works with legislative inequalities.*

We talked about..

- The similarities between placemaking and digital rights; who are the people engaged there and who's right is it to have access
- The importance of having places where citizens don't have to consume
- The power that private urban developers have in dictating the landscape of the city
- Importance of fostering a link between the municipality and grassroots, pop-up ideas that can circumvent regulation for prototyping ideas
- Deconstructing place narrative to understand future narratives that support plurality in a place
- The imbalance between the resources poured into place-making over place-maintaining
- Looking at the inequalities of power systems by creating a space that rethinks our economic system

Talking with James Fincane

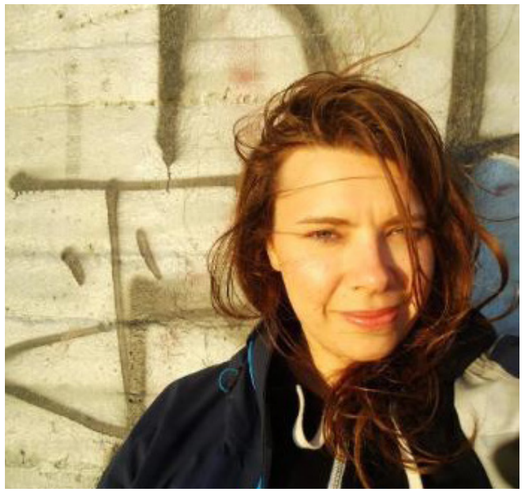
James is the founder of Street Art Oslo, creative director of Løkka-Lykke and co-founder of the Subvertising Norway collective.

I visited the office of Subvertising Norway in Grünerløkka and sat down with James to hear his perspective on graffiti and street art in Oslo, as well as the role that advertising plays in the urban landscape. Originally from the UK, James provided a local perspective on the topic, highlighting the role of the municipality and private actors in determining the rollout of advertising in the city. His contributions were instrumental in shaping the project's theoretical framework and provided valuable insights into how advertising and graffiti in public space were perceived by citizens, municipal actors, and private companies alike.

> *If Oslo was a ghost town, advertising would have no value. It's the fact that you and I walk down the street and these ads court our attention that gives them value. So it stands to reason that this whole business model should compensate the people who create the value.*

We talked about..

- The advertising agreement in Oslo and if the trade off for funding public infrastructure was fair
- The criminalization of graffiti and the emergence of out-of-home ads in Oslo as its relates to the fight for attention
- Difference of ads on digital platforms compared to public places
- The city of Bergen and how they've successfully banned outdoor ads in the city center
- The disassociation that social media has had on people communicating with one another
- The municipal channels that citizen go through to file a complaint against an advertisement
- The reason behind someone's right to own a building being more important than someone's right to express themselves



Talking with Emma Arnold

Emma Arnold is an urban scholar working at the intersection of urban planning and urban geography. She wrote her PhD in Human Geography, specifically using psycho-geographic and photographic study of graffiti and street art in Oslo. She is currently working as a postdoctoral research fellow at UiO.

Arnold's two papers, *"Sexualised Advertising and the Production of Space in the City"* and *"Aesthetics of Zero Tolerance"*, offered a novel perspective on themes addressed in my research for this diploma. Her work delves into topics such as Oslo's legislative approach to graffiti, the impact of advertising on communities, and Lefebvre's "right to the city". We met at a local coffee shop in Grünerløkka for a few hours to discuss her work and how it relates to the augmented city. With her unique background in street art, documenting urban life, and climate fiction novels, Arnold offered valuable insights into how the AR-layer could create opportunities or consequences for urban inhabitants.

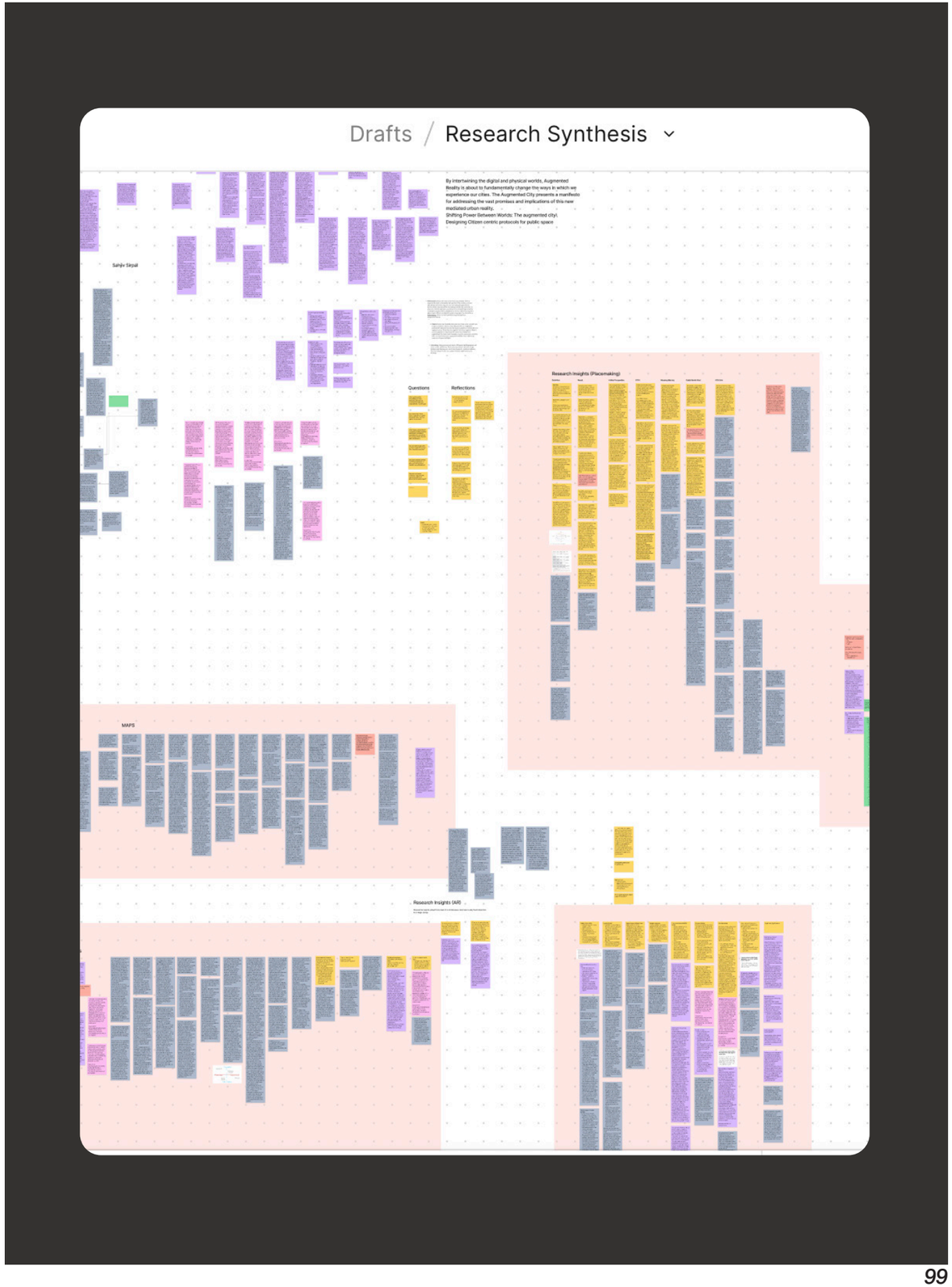
> *If you look at how they policed certain things like graffiti and street art, which was very strict with the zero tolerance policy, then with advertising, its not strict enough. It depends where the profit it. Because one of the reasons for zero tolerance was for the impacts, economically, it has as it impacts the image of the city. I can imagine the municipality wanting to control the AR layer of the city.*

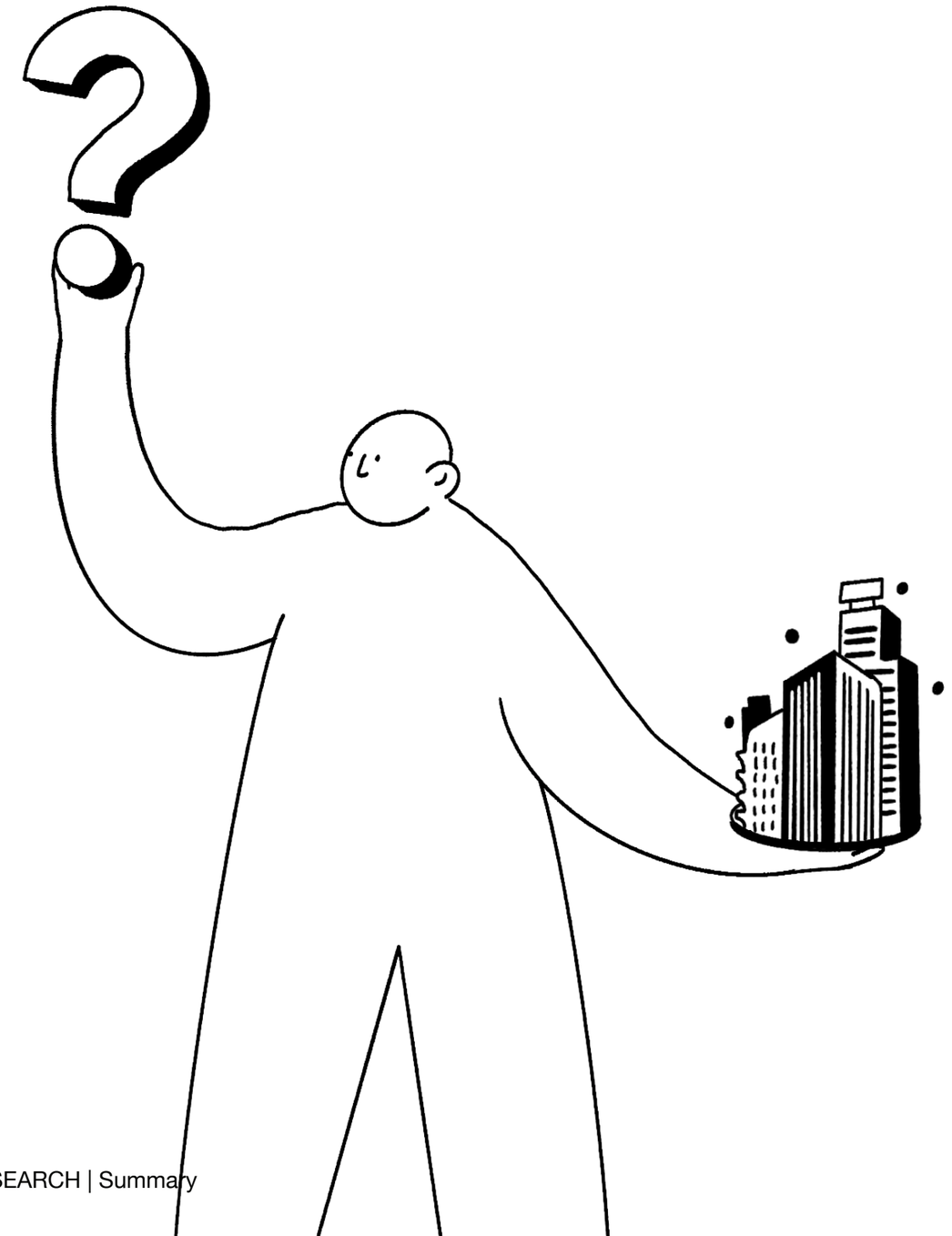
We talked about..

- The need for impact assessments on OOH advertising
- Electric scooters as an example of platform urbanism in cities
- How advertisements are framed with a sense of formality in the city compared to graffiti
- The role of developers in determining what public space is compared to publicly-accessible space
- The equivalent of a red-light district in the augmented city
- How to disrupt the capitalist flows of the city, and re-define our citizenship away from being commodities and consumers

Synthesis & Analysis

Throughout the months of research, I collected notes, excerpts and my thoughts into different gigamaps on Figma. As I learned more about the different components of this world, I would add to it knowing it would inform the deliverables later on. These maps were referenced throughout the project and were the basis of my foundational research. The building blocks in the next section are a direct outcome from the themes I identified while synthesizing the research.





The research phase yielded numerous insights into the field of AR as it relates to public space and cities. However, the common thread throughout my findings was that there is a lot of uncertainty regarding what the future of augmented reality will actually look like.

Nevertheless, one thing is certain: there are and will be augmentations.

4

DESIGN

This chapter has three parts that review the deliverables of this diploma. The parts include:

1 **Defining the building blocks.**

Explaining how they will impact the augmented city and why the theme was chosen.

2 **Applying the building blocks.**

Creating a set of ideations that visualize examples of what the experience of the augmented city could be like.

3 **Evaluating the building blocks.**

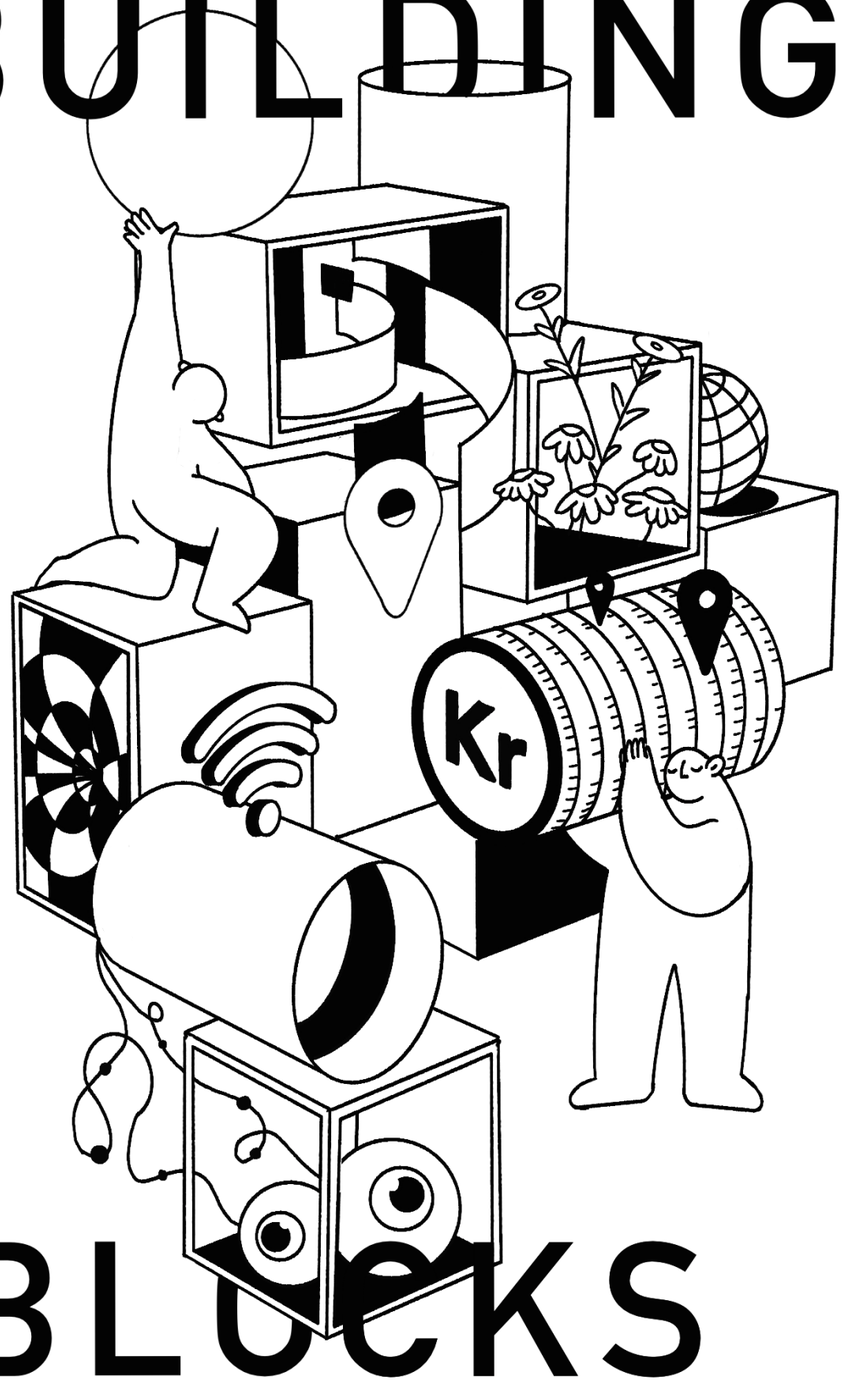
Defining a new set of rights for the digital citizen, as it relates to the augmented city.

1 *Defining* **The Building Blocks**

The first part of the project's deliverables define 7 building blocks that craft the future of the augmented city. The blocks cover key areas that will impact how the AR-layer will affect citizens including business models, system architecture, content type and its impact, power structures as well as regulation approach. This section goes through each of the building blocks, and explains how they relate to the AR-layer.

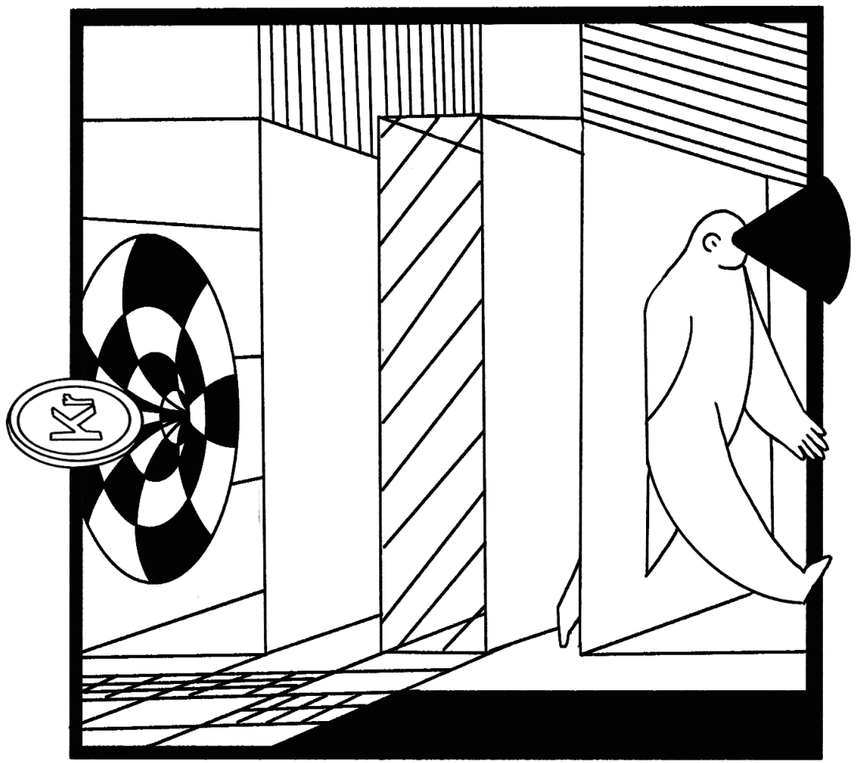
These building blocks were later used to fuel the ideation phase of this project, visualizing scenarios that illustrate possible ways that citizens can interact with the digital layer of public spaces.

BUILDING BLOCKS



In an augmented city:

1. Digital zones dictate everything.
2. A communal garden is championed.
3. Advertising models are phased out.
4. The cloud sets power structures.
5. Place-types have different rules.
6. Virtual skins alter your perception.
7. Hyper-local content reigns.



Building Block 1 / 7

Digital zones dictate everything.

The AR-layer hasn't been zoned yet for cities, meaning the decision on who draws the lines between public and private space is still up for debate.

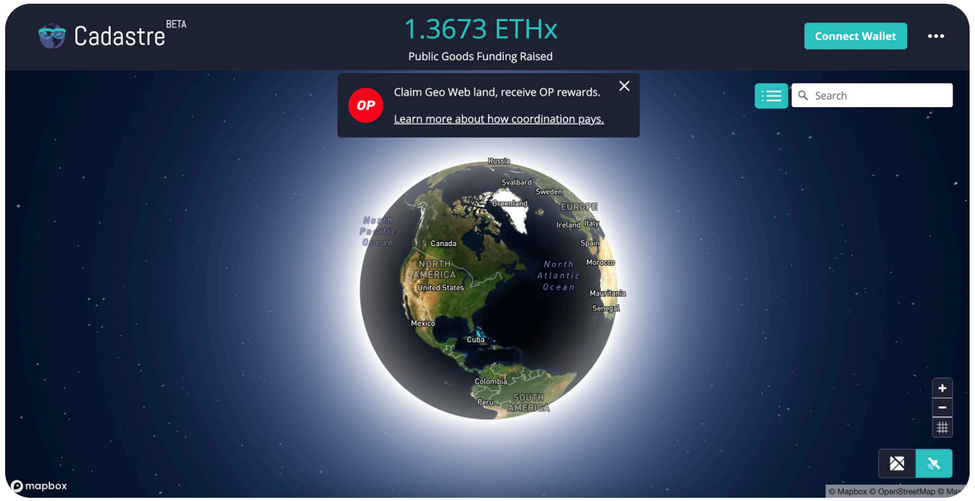
Zoning is a crucial element in the development and management of the AR-layer in cities. It is a way to create digital boundaries that correspond to physical space, enabling the triggering of virtual content assigned within specific locations. The protocols for location-based digital content play a significant role in the proliferation of AR in cities, as they dictate how space is used and distributed in the augmented city.

However, the way zoning and regulation are handled could have significant consequences for the AR-verse. If the owners of physical space determine the virtual experience of everyone within their boundary, it could create a situation where digital content is monetized and used to maximize attention at any means necessary. This could result in the gentrification of urban neighborhoods, as popular locations become increasingly valuable and priced out of reach for the majority of citizens. It could also lead to further exclusion of minority populations from being able to own digital parcels of land, exacerbating existing inequalities.

The use of supporting technologies like Virtual Positioning System (VPS) makes it possible to accurately pinpoint all compatible devices within half a centimeter of precision. This means the zoning of the digital world can be more precise than that of the physical world, with strict lines distinguishing between public, private, and privately owned public space. However, the rules and rights attributed to the digital twin of physical property are not always straightforward.

The rules and rights related to the digital twin of physical property are complex, with many gray areas such as lost or disputed records, foreclosure, or properties rented out to tenants. The bigger problem lies in public space, which is supposed to belong to the city and urban inhabitants. Without conscious input from these actors, the AR-layer could become a new way of attributing ownership onto space that perhaps wasn't meant to be owned in the first place. This could result in the privatization of public space, with private companies or individuals seeking to control and monetize virtual content within public areas.

Case Study Geo Web



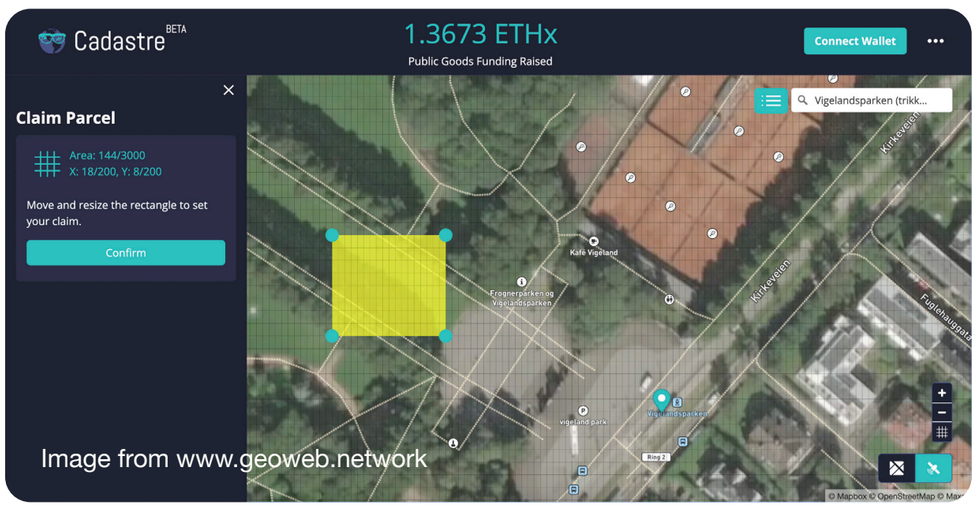


Image from www.geoweb.network

Geo Web is selling digital land parcels as non-fungible tokens in exchange for crypto currency.

Geo Web is a “public good augmented reality network” that uses open-source protocols to create a persistent virtual layer accessible to everyone. According to their website, their goal is to enable permissionless economic opportunities and creative endeavors by creating a shared reality.

The platform allows users to purchase licenses for parcels of land at self-determined prices. Once payment is made through a crypto-wallet, the land licensor is given an NFT of the land parcel, which they can link to their digital content. The land parcel’s price remains viable if no other user challenges it with a higher offer, incentivizing active use of the space. If a higher offer is made, ownership transfers to the higher payer. The licensor of the NFT determines the content anchored to the coordinates of that physical space.

Geo Web states that their technology can be used for events like concerts, promoting restaurants, or offering games. Users within the parameters of the land parcel and with the appropriate devices, such as a smartphone, smartwatch, or smart glasses, can view this content. The platform states that all income from selling land goes toward a public good fund, but does not specify what this entails or who benefits from it.

What does this mean for the AR-layer **of a city?**

They’re selling the digital equivalent of physical, public places to anyone with a crypto wallet, and knowledge of trading in crypto currency. Beyond privileging those with high levels of digital and technological literacy, it also begins attributing prices to space that was otherwise considered free and open to all. Their system of purchasing NFTs of land parcels also removes the context of place completely from the location, as the land licensor could be someone on the other side of the world who simply had the money and know-how to add a huge ad for Starbucks for anyone to see while they’re walking down a street.

They’ve stated good intentions with this system, and seem to be attempting to provide an alternative solution to the options being offered by Big tech. However, they have already begun setting precedent for how we should treat physical land in augmented space and the method of setting boundaries between public and private properties. Lastly, ownership is intrinsically tied to this system. While this ownership can be transferred, it leads me to believe they continue to prioritize the individual, or a company, overlooking entire communities of inhabitants having a say.

This building block is used to explore questions like:

- Who should be allowed to purchase or rent parcels of digital land that correlate to physical public places eg. Jernbanetorget or Vigelandsparken.
- Should foreign actors be able to contribute content to these parcel locations, even if they’ve never set foot there?
- If there is an element of monetization from content viewed within that digital land parcel, who should be included in the profit?
- Could this be entirely regulated by the city through permits?

Why is this important?

Zoning and distribution of virtual land rights will be a defining factor in how citizens interact with their city, impacting their ability to post and view specific content. The frameworks for defining these zones, land parcels, and ownership rights will be critical for maintaining or redefining power structures. Physical land will be translated into its digital twin to make AR content accessible by location. It’s important to consider who and why.

Building Block 2 / 7

A communal garden is championed.

The system architecture of the AR-layer will dictate how and when citizens access it as well as who will be allowed to dictate the terms of interaction.

The digital layer was built on the public consensus that to prevent a monopoly of this space, as was seen with the centralized, siloed approach to web.2 platforms, there needs to be a “communal” garden approach. The dominant players building the required infrastructures were to enable high levels of data portability and interoperability within the AR and VR ecosystems, resulting in an open platform sharing a single cloud based map.

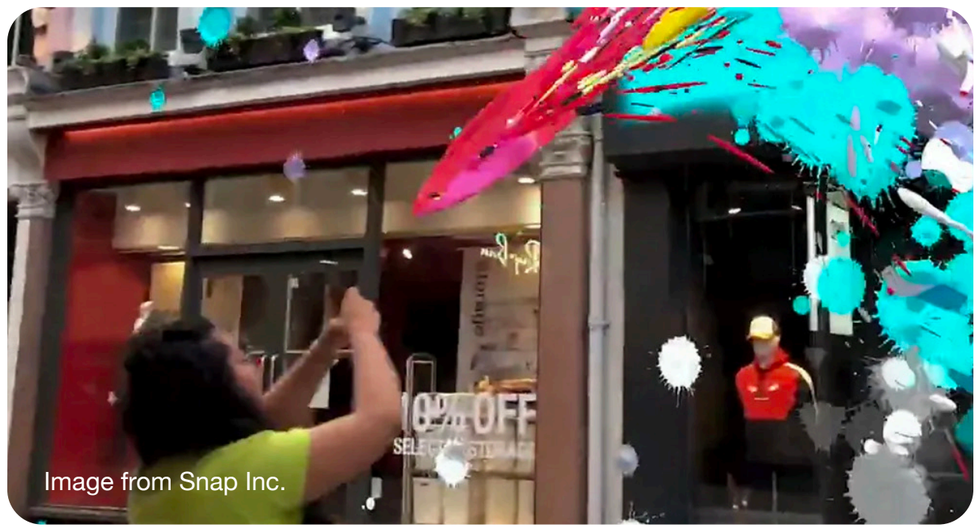
This resulted in creating one shared experience on the primary AR-layer, which created scarcity in the virtual world. While space in the online world was seemingly infinite, the digital twin of the physical world is a finite resource, as pinned content is restricted to the number of land parcels in the real world.

By not enclosing citizens within a single ecosystem controlled by a private company, it enabled creativity to flourish while reducing the trend of surveilling citizens and channeling all the data into siloed platforms reducing their dependence on a singular provider.

Digital platforms previously existed as walled gardens that determined access to their own centrally-owned private servers. This means that those same services and access to any hosted information could be revoked by the platform owner so long as it was deemed the user was not abiding by their terms which tended to benefit the owner over the user. This system resulted in users never actually owning any of the digital experiences they engaged in but enclosed them into specific platforms as they have invested their time into developing data and assets that can never leave the closed system.

A decentralized approach allows citizens to interact with the augmented city with more safety, privacy, and less manipulation because it gives them greater control over their experiences. By establishing a communal garden, it’s taken the power away from those who value profit over user privacy and control in a new virtual landscape ripe for exploitation. By championing a decentralized approach, it’s taken the power away from one single company wielding complete dominance on how Web 3 is experienced and integrated in our society, all the while supporting innovation in this new digital paradigm.

Case Study Snap Inc. Local Lens



Snap Inc. launched an augmented reality experience called "Local Lens".

Snap Inc. launched a new augmented reality experience called "Local Lens" that is a proof of concept for creating a digital copy of everything on the planet. This project is aimed at transforming entire neighborhoods into digital canvases, and it was first launched with an app called City Painter. The app lets users spray virtual paint on buildings and compete with others to cover them in their colors. This app represents the possibilities of the AR-cloud, a 1:1 scale digital version of the world where every street, building, and room in a city will have a digital twin hosted in the cloud. This will enable virtual experiences to be built around whole neighborhoods or cities, accessible only to those present in the real-world location.

Snap's Senior Manager of Research Engineering in London, Qi Pan, describes the project as a single, shared reality where changes made to the virtual world can be seen by others almost instantly, and they persist even if everyone leaves the experience and new people join in. "Local Lenses" is just one of Snap's latest projects, which includes their version of AR smart glasses called Spectacles. The company refers to its AR filters as "lenses," and their publicly available tool has resulted in one million filters created for augmented reality experiences. All of their efforts are aimed at training their patented camera to understand the world and all that it sees.

What does this mean for the AR-layer **of a city?**

Snap Inc. is only one of the many players racing to create an ecosystem that will draw in enough users to be considered the primary platform for shared AR experiences. City Painter is an example of a closed platform where its owner decides what's allowed and what's not all because they were the first to offer a 1:1 digital map of the world to users with a value proposition that kept them there.

By deciding the type of tools given to users to augment a space, which locations can be augmented (in this case a popular street in London), the type of content that's allowed and which of their software and/or hardware is required to view the content. They create an entire ecosystem for which they enclose users into a landscape by which they control. All experiences developed by creators for Snap Inc. cannot be taken outside the platform and solely exist within the frameworks they've dictated. In this case, it should not be considered a persistent, shareable augmented reality experience as not everyone can access it.

This building block is used to explore questions like:

- Who will need to be involved in petitioning against walled gardens in the AR ecosystem?
- How could a decentralized approach to AR work? Who would spearhead its development? With what resources?
- How can this system be built in a symbiotic relationship with private technology companies? What would the advantages/ disadvantages be?

Why is this important?

The way in which the AR-layer is structured, either as a closed or open ecosystem, will be a defining factor. Controlling the cloud and who holds power over it will be crucial in preventing monopolies from forming. To avoid corporations from privatizing the digital map of the world and prioritizing their interests over local communities, a communal garden model should be championed. This would allow citizens to see and participate in all the augmented experiences without subscribing to multiple services, purchasing different types of hardware, or learning unique gesture languages. By creating a planetary-scale communal garden, we can minimize the risks associated with closed ecosystems and ensure a more inclusive and accessible AR experience for all.

Building Block 3 / 7

Advertising models are phased out.

The AR-layer will not be optimized to support targeted advertising as it's become an outdated business model. but redistributes profit to different stakeholders.

The AR-layer is ripe for piloting alternative methods of profit and business models that move beyond targeted advertising. In the past, the competition for private companies to own digital platforms led to a closed system optimized for targeted advertising. However, recent public pressure campaigns have resulted in a shift in expectations, pushing for structures that redistribute wealth in a more balanced way.

Instead of advertisements embedded into every surface and interaction, contributions to the AR layer are now seen as a new currency. As the AR-layer continues to evolve and become more integrated into daily life, there will be a need for even more innovative approaches to monetization. This opens up opportunities for creative models of transaction that benefit both viewers and content creators. The current model of the advertising economy is outdated and ineffective, and a paradigm shift is needed to explore new models that prioritize social good.

Rather than relying on ad-blocking extensions as a temporary solution, a new model that prioritizes profit streams that enhance the AR experience needs to be developed. The augmented city will reveal new systems of profit, changing the dynamics of who benefits. This could mean more direct payment subscription models or payment towards content producers as we have seen with NFTs. It could be commission based or sponsored. Whatever the transaction involves, it will need to be careful of not excluding citizens by setting unattainable pricing schemes.

The augmented city holds exciting opportunities for exploring different profit and business models that prioritize social values over capitalist interests. By exploring these models of transaction and embracing a more equitable approach, we can hope to build a better future for all in Web 3.

Case Study Doodles NFT

Image from Doodles

Doodles is an example of a successful NFT project by Evan Keast, Scott Martin, and Jordan Castro.

Digital platforms are increasingly adopting alternative revenue sources to advertising-based models, like Non-Fungible Tokens (NFTs) and subscription-based models emerging as popular alternatives. One example of this shift is seen in the rise of NFT-based memberships, which offer exclusive access to content, events, and perks for a fee. NFTs, in particular, have become increasingly popular as they offer a unique digital asset that can be traded and sold with crypto currency.

An example of this are “Doodles”, which are colorful drawings sold for thousands of dollars each, with the creator receiving a significant portion of the profits. By leveraging the unique properties of NFTs, they can monetize their content in a way that’s not possible with traditional advertising-based revenue streams. This creates a direct relationship between the creator and the consumer, allowing for more transparency and control over the content and its distribution (Stelzner, 2022).

As digital platforms continue to move away from targeted advertising for their main profit streams, alternative revenue sources like NFT-based memberships and subscription-based models are likely to become more prevalent (Stelzner, 2022). As the digital landscape continues to evolve, it is essential for platforms to adopt sustainable and equitable models that benefit all stakeholders involved.

What does this mean for the AR-layer **of a city?**

The platforms that host ads and collect user data profit the most in targeted advertising, with advertisers benefiting by reaching their intended audience more effectively and generating a higher return on investment. Unfortunately, core consumers and creators on these platforms are often not compensated for their work, being treated instead as a product.

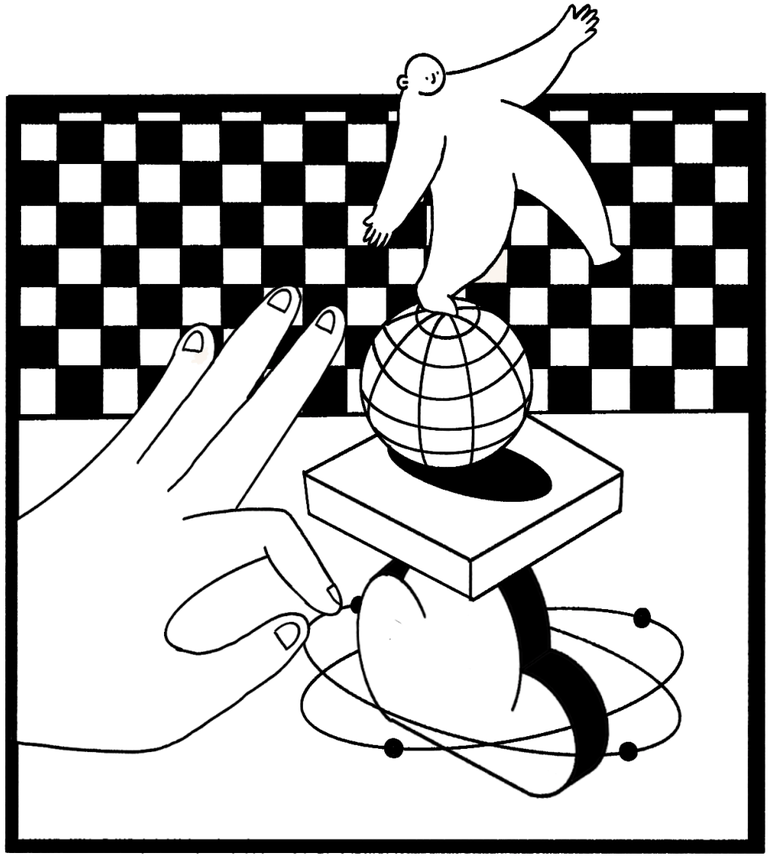
It's increasingly recognized that digital advertising isn't as lucrative or effective as once thought, with platform owners exaggerating statistics. Transitioning to the AR-layer will require new profit models that prioritize viewers, contributors, and creators in a more balanced manner. This will likely involve multiple profit streams for all actors involved, distributing wealth to more stakeholders. NFTs may play a prominent role in how content is handled in the AR-layer, or they could serve as inspiration for ways to empower and compensate creators. Regardless, advertising will take a backseat.

This building block is used to explore questions like:

- What alternative forms of economic transaction can be explored as payment forms in the AR-layer? What elements of this platform can be quantified as something of value?
- Beyond advertising and subscriptions, what other revenue streams could be integrated into this platform? How can the average user "profit" from it?
- If this platform monetizes location based content, who should profit from it? Who should pay for it?
- If this platform was tax-funded, how would that change the power structures behind controlling this platform?

Why is this important?

Digital platforms that rely on advertising as their main source of revenue have exacerbated the surveillance and attention economies that exploit users for profit. In addition, these platforms create significant disparities in the distribution of profits, where core consumers and creators are often not fairly compensated for their work and are instead treated as products. The integration of an AR layer presents an opportunity to address the negative impacts of these platforms and reimagine how we view profit and the transactional relationship between providers and consumers.



Building Block 4 / 7

The cloud sets power structures.

The AR cloud is the foundation of all location-based AR experinces, becoming a new urban infrastructure that maintains platform access for all city inhabitants.

After digitalizing the world at scale, virtual worlds now coexist with their physical counterparts and are experienced spatially through the AR-cloud. This map allows any virtual object to be located and positioned with millimeter precision in the real-world. Whoever owns the cloud map and its associated infrastructures will dictate the frameworks that allocate power to stakeholders based on which incentives are prioritized in the design of the map.

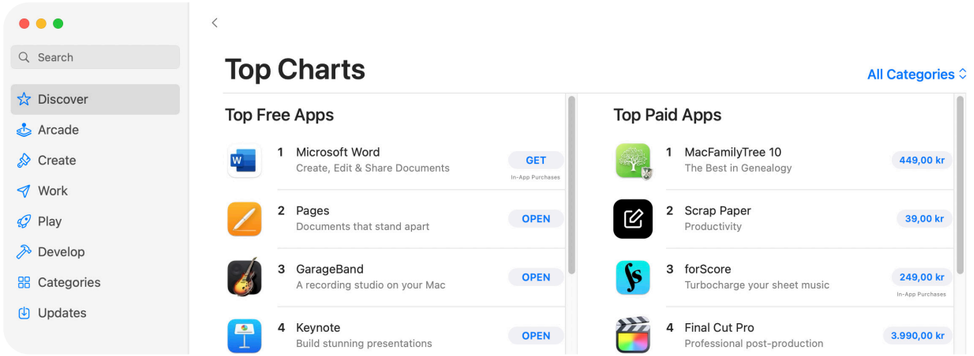
The AR-cloud uses data streaming and location-based technologies to enable optimized augmented spatial experiences in cities. Ownership of the cloud will determine which economic opportunities are afforded to who, and possibly result in the exclusion of marginalized populations from participating in this transactional ecosystem.

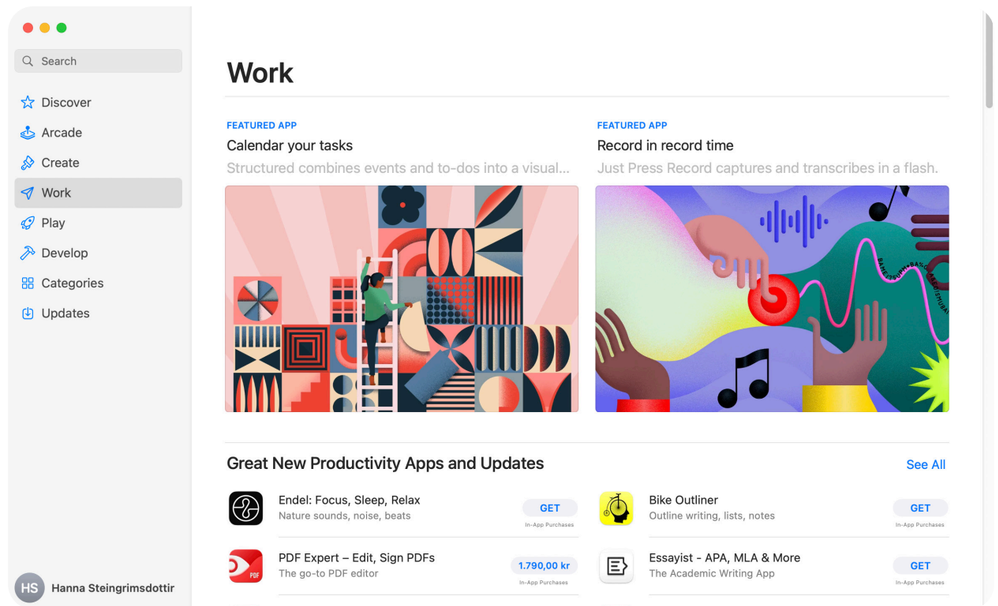
While there is no telling if there will be a singular or competing cloud that maps the world, whatever the result is will have significant implications for how the next wave of public and private platforms and applications will be developed and distributed.

With the improvement of global localization technologies, devices will quickly begin mapping the world around it. As Bucknell describes in her manifesto on the augmented city, “the experience of the augmented world and the mapping of the physical world will occur simultaneously, creating an unprecedented equivalency between production and consumption.” This will mean that an augmented city is also a monitored one, as it will require users to allow their devices to contribute to the live map of the world, and automatically upload all changes to their environment. As this will violate privacy concerns, private spaces will first undergo legislation. However, what will happen to public spaces that are constantly monitored and all changes to its environment are kept track of?

The AR Cloud will be able to offer experiences open to all while equally offering subscription models that lie behind a paywall. Depending on the architecture of these systems, it could be entirely up to the platform providers to decide how this system unfolds and who will profit from it.

Case Study Apple iOS





Apple provides all their services within a closed system to maintain tight control on their user's behavior.

Apple's control over app distribution on iOS puts pressure on developers to include in-app purchases that will create more opportunities for them to take a cut of the profits. They mandate that all apps selling digital goods of any kind use its payment system in order to take a 30% fee from any subscriptions processed on its platform, even from third party apps (Bohn, 2021). This often leads to outside services refusing to allow their users to purchase any digital goods in-app to prevent this tax. The issue here stems from the fact these transactions all occur within Apple's closed system. Unlike Google's Android, which allows apps to be added onto the phone without an official app store, Apple holds an iron grip on all interactions within their operating system (Bohn, 2021).

Apple's promise of a better user experience through augmented reality and digital conveniences like Apple Wallet comes at the cost of ceding control of one's life to Apple's digital realm, despite avoiding overt malevolence. Ultimately, Apple operates towards the same end goals as other Big Tech companies: growth and profit (Beres, 2021).

What does this mean for the AR-layer of a city?

Profit often serves as a tangible representation of power. It signifies both the party gaining it and the party losing out on it. Big tech companies like Apple, Google, and Amazon have built their services in ecosystems completely under their control, giving them almost limitless authority over the structures of daily life.

The infrastructure of platforms, as seen with these companies, results in corporate entities amassing unparalleled control over people's lives. This will be no different in the augmented city. Those responsible for creating the infrastructure, such as the AR-cloud, will dictate the parameters of all digital interactions, granting them unrestricted management of the digital realm.

This building block is used to explore questions like:

- Who should be allowed to own places and infrastructures that existed before the map digitized it?
- What measures can be taken to reduce the harms of a single, or handful, of private companies controlling sensitive information that will be produced in the AR cloud?
- How can we enable local communities ownership of the digital map of their cities?
- Should local governments monitor the mapping of their cities?
- How should citizens be involved in mapping their local environments?
- Is there a place that has the right not to be mapped?

Why is this important?

Maps are not neutral tools for conveying information; they hold immense power. The entity that controls the map also controls the values that are embedded in the system's architecture. As we have witnessed with other digital platforms, these systems extend their reach far beyond the borders of familiar social and cultural contexts. The globalization of these digital platforms means that a single power is dictating the frameworks by which some cities are governed, without the oversight of actors who have a vested interest and responsibility to the community they belong to. Allowing private companies to own these maps will have far-reaching implications, both positive and negative. The 3D digital map of the world will exert power in both overt and subtle ways that are invisible to the people they affect.

Building Block 5 / 7

Place-types have different rules.

The AR-layer will categorize digital land parcels as either public or private property. This will result in a new set of regulations for what is, and isn't, allowed and for who.

Establishing clear boundaries between public and private property will be crucial in defining the rights and rules governing the digital twin of a city. Local governments must determine who owns public property and how these rights should be protected. While defining property rights is challenging, public spaces cannot be left unregulated just because there is no clear ownership. Public spaces technically belong to citizens, who should have equal opportunities to use and benefit from them.

As we have seen with the widespread adoption of smartphone cameras, societies can rapidly develop new norms and social contracts for acceptable behavior in different contexts. The same will happen with the AR-layer of the city, which requires significant resources to create and maintain the constantly evolving digital map of the world. This will require clear standards of conduct for both citizens and platform providers to ensure that this new digital sphere is used responsibly and ethically.

While defining property types is a well-established practice in urban planning, there are still gray areas around what constitutes public, private, and publicly accessible private space. The AR-layer demands clear distinctions between property types because content contributions and moderation rules will vary depending on the location. By regulating these spaces differently, governing actors can prevent technology companies from appropriating public spaces as free advertising spaces.

In short, clear rules and boundaries for property rights and usage in the digital twin of the city are necessary to ensure that citizens have equal opportunities to benefit from and contribute to public spaces. Hopefully, this will prevent companies from exploiting these spaces for their own purposes.

Case Study Niantic's Pokemon Go

Image from Pokemon Go

Image from Alysse Bryson

In 2016, Pokemon Go was released and quickly became a global phenomenon.

In the game Pokemon Go, virtual objects were placed at real-world locations chosen by game designers. Popular places were specifically selected for their foot traffic, and data from an earlier game called Ingress was used to build the original list of landmarks. The game lets users explore the real world by visiting areas designated as "Pokestops" and "Gyms," which could be anything from their sidewalk to their town square.

However, concerns were raised about where and when it was appropriate to have AR experiences, prompting a debate about whether there should be no-go zones for certain AR experiences. Despite complaints, there is no easy or fast way to request that a specific location be removed from the Pokemon Go map. The location in question must be reported to the company's customer complaint section and reviewed by an employee who will attempt to remove it for the next scheduled update, but there is no guarantee that it will be removed.

What does this mean for the AR-layer **of a city?**

The widespread popularity of the AR game Pokemon Go raised questions about how location-based AR experiences should take into account the context and significance of their location, and the lack of rules or codes of conduct that restrict game creators from placing content anywhere they please.

Niantic established gyms and pokestops in public and private locations, attracting crowds of people to certain places whenever the assets were discovered. This resulted in public transit being overwhelmed, noise complaints from local residents, and a general lack of respect for places with cultural significance. The social rules governing different types of places are often learned over time. However, the integration of the digital layer can challenge and transform these rules depending on the type and amount of content pinned to a certain location.

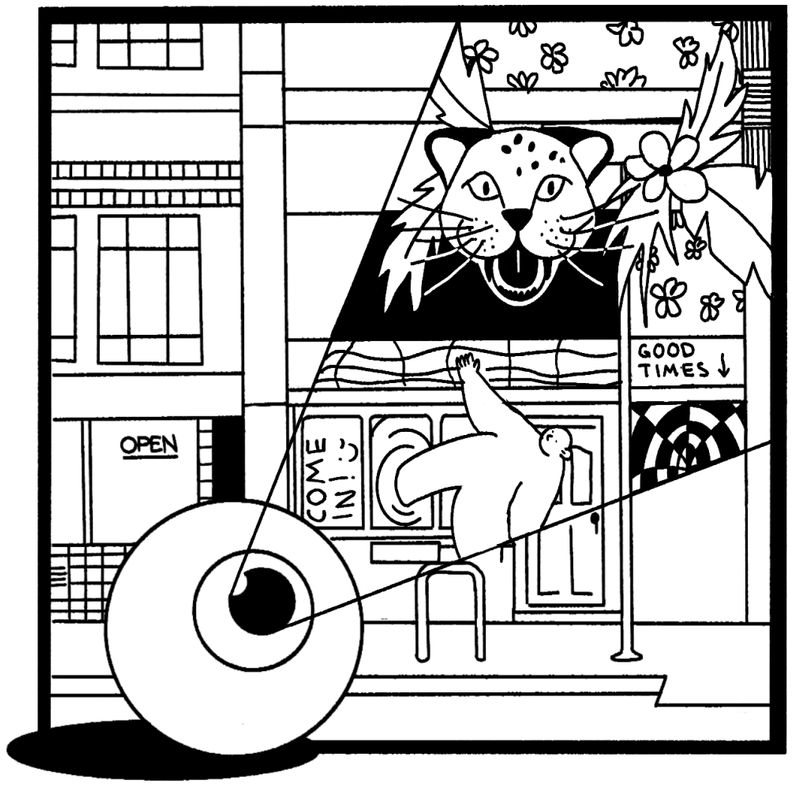
This building block is used to explore questions like:

- Who will dictate what is considered public places and privately owned public space? How will the main benefactors be acknowledged and how will the excluded communities be identified?
- Should there be any difference in how content in the AR-layer is regulated depending on the place-type?
- What are possible opportunities or consequences if we all deemed there to be no difference for place-types in the AR-layer?

Why is this important?

Currently, private companies involved with AR experiences, particularly those based on location, tend to view public space as an open playground where they can post content for their users with little consideration for the consequences. This mindset is rarely challenged by local actors unless they experience negative effects from the platform. It is important to question this approach and emphasize that public space is owned by citizens, and companies should take responsibility for the possible impact of anchoring content in a public location.

Determining the boundaries between public and private property can be challenging, but it is essential to communicate them clearly to citizens. As such, it is crucial to establish rules or guidelines that regulate the use of public space for AR experiences, especially those that may cause disruptions or conflicts in the community.



Building Block 6 / 7

Virtual skins alter your perception.

The AR-layer will augment all things; people, places, objects and buildings. Virtual skins has become the new norm in the way we perceive the world around us.

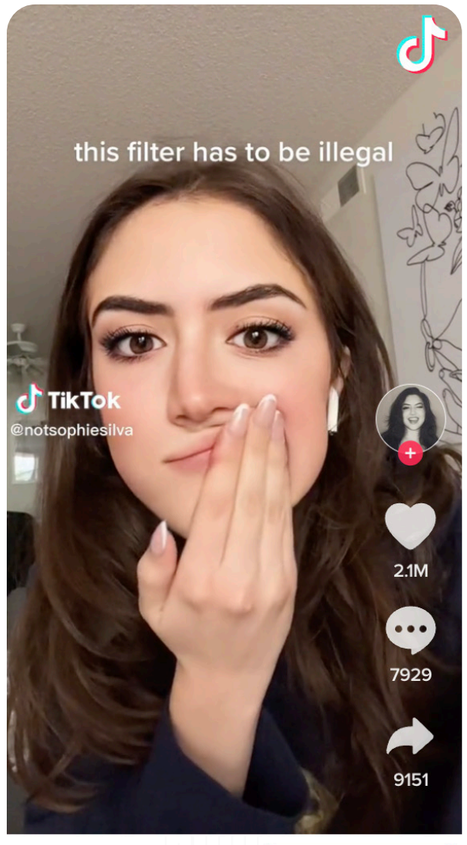
The built environment is quickly becoming a canvas for additional digital content, changing how we understand space and interact with one another as we bridge the physical and virtual worlds. The digital skins crafted for physical structures will inherently be biased towards their creators, and as a result, will greatly impact our perception of place. With the increasing use of deep fakes and filters, authenticity will be highly valued and a seal of legitimacy will be sought after.

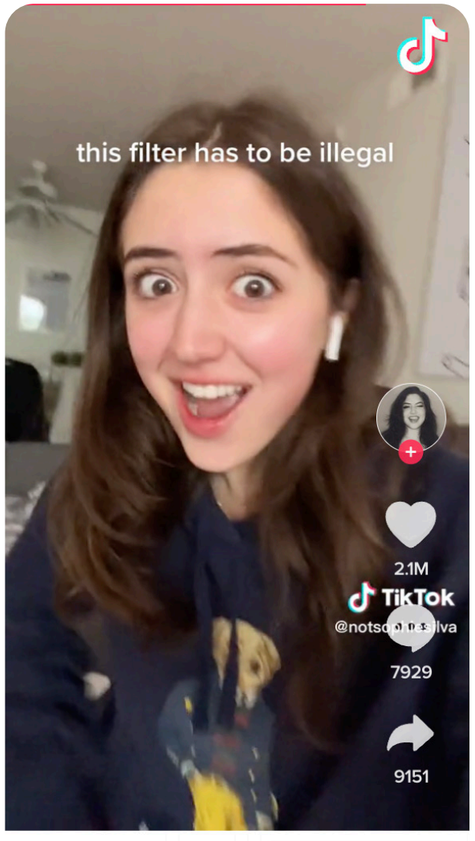
A recent study suggests that our brains do not significantly differentiate between viewing objects in AR compared to the real world. This means that the physical and virtual worlds can easily merge without our minds fully comprehending the impact. As the physical world becomes searchable, clickable, and responsive, it can easily modulate the context of place. This shift will significantly impact many aspects of city infrastructure, including urban planning and architecture.

Bucknell, in her research paper depicting a manifesto for the augmented city, proposes that architectural materials will also need to be designed with the AR layer in mind, as they will require a certain level of understanding in order to affix digital graphics onto them. For instance, building materials with properties like reflectiveness and transparency are not easily interpreted by sensors and cameras, making it challenging for the AR layer to recognize and utilize them. Thus, locations that prioritize the importance of the digital layer will incorporate materials into the street-level floors of buildings to enable better machine-readability.

Space Popular suggests that in the augmented city, the built environment will command more attention compared to static facades. Buildings will be transformed into interactive and dynamic fixtures, and virtual craftsmanship will attain similar status as low and high-end production today. The value of these digital elements will be seen as a reflection of the worth of the location they are pinned to, where high-quality skins will communicate information to citizens about what lies behind them.

Case Study Bold Glamour Filter





Bold Glamour is a beauty filter on TikTok that contours users' faces and noses, evens complexions and fuller plumper lips.

Bold Glamour is a beauty filter on TikTok that contours users' faces and noses, evens complexions, makes eyebrows symmetrical and fuller, and plumps lips. Although beauty filters that augment facial features to conform to ideal beauty standards are not new, Bold Glamour is considered the next generation of filters because it does not glitch or distort the user's face if an object is placed in front of it. This is because it has been developed differently from most face filters, which map the user's 2D camera feed onto an exaggerated 3D model of the face, making it difficult for the overlay to adhere to the face's layout if the view is obstructed.

Memo Akten, assistant professor of computational art and design at UC San Diego Visual Arts, says, "This is a bit of a milestone, and an indicator of the weirdness of the post-reality world that lies ahead".

Bold Glamour likely uses machine learning technologies like GANs to achieve this. Although the use of this technology is not new (think deep fakes), it is new to be able to use it on the limited processing power of smartphones. As creators gain access to tools that allow them to use AI for filter application, they will achieve a level of believability that continues to blur the line between reality and augmentation.

What does this mean for the AR-layer **of a city?**

Although face filters have been in use for almost a decade, they have recently reached new levels of realism. Even when they are applied on platforms that offer these tools, many filters are difficult for the average person to detect. But what will happen when filters extend beyond just augmenting human faces? What if they are applied to buildings, objects, and the natural environment?

If devices become the mediators between our eyes and the real world, the application of filters could easily be expanded to cover the entire physical realm. The impact could be similar to that of Bold Glamour, where the augmentations are so subtle that people have difficulty distinguishing between what is real and what is fake. While this could result in natural elements becoming more vibrant or construction sites being hidden from sight, it could also remove elements that are core signifiers of culture in a city.

Additionally, the creators of these filters will be the arbiters of what is deemed ideal, beautiful, or acceptable in cities. As there is no single narrative that represents all communities, certain narratives will inevitably be highlighted over others. This could result in a lack of diversity in the augmented city, where only certain cultural expressions are deemed worthy of being showcased.

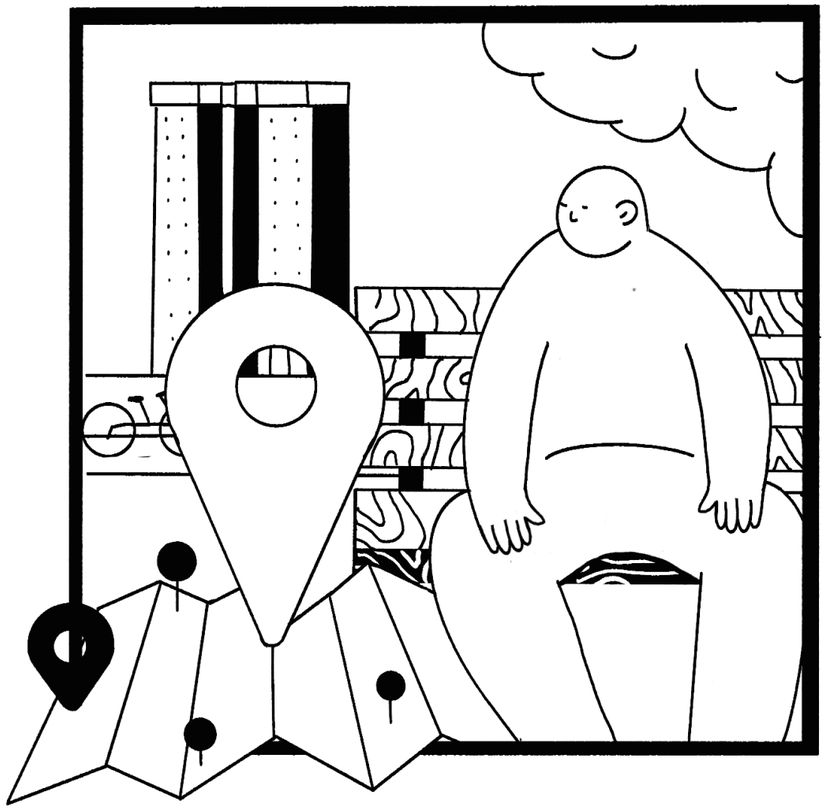
This building block is used to explore questions like:

- Who decides what these virtual skins will look like? How will tone, source reliability and content quality be used to communicate affordances for a space?
- Can this be used to reduce or amplify the exclusion of communities in public space?
- How will differing levels and quality of content be a signifier in the wealth of a neighborhood?

Why is this important?

This situation brings to mind the saying, “what’s the worst that can happen?” We’ve already seen how filters on social media can create unrealistic beauty standards that cannot be achieved in reality. Now that filters are moving beyond just the human face to objects, buildings, and even entire cities, there is a potential for these filters to manipulate citizens into believing in a world that is not real. If we begin to rely on augmented reality to guide our perception of the world, the person behind the filter will have considerable power in shaping the narratives and societal values that are promoted.

It’s likely that virtual skins on the built environment will become a natural extension of augmented reality. In this world, augmenting personal avatars will be a key feature, and managing these “place skins” will play a big role in placemaking going forward.



Building Block 7 / 7

Hyper-local content reigns.

The AR-layer will be largely comprised of geo-located content meaning digital information will co-exist with the physical envrionment.

The proliferation of geo-located content will create a new era of hyper-local virtual information accessible only through physical proximity. By entering boundaries, citizens can access exclusive audio-visual content specific to that location. This will give rise to new forms of collectible content for site-specific micro-experiences. Context will be everything and access will become the new currency of the augmented city.

Contributors can add annotations to the city, creating a constantly evolving and fluid layer. For instance, you can see where your friends sat for brunch last week and the bottle of wine they had to share. You can also learn about the historical significance of a sculpture, as well as the problematic history of its sculptor, all in the same view. There will be new ways of communicating spaces to people passing by, injecting voices that could have otherwise remained unheard. Unique one-off experiences will become exclusive items for brands, companies, and influencers to develop that are site-specific.

With geo-positioning achieving near exact precision, the concept of “local” will take on a new meaning. The value of space will move beyond functionality or monetization potential and towards its ability to become part of the collective commentary of the AR-layer. By geofencing content within certain boundaries, the AR-layer will guide citizens into unique patterns of movement to experience popular content parcels. New types of spaces will emerge that enable counterculture to flourish, especially in public places where the boundaries regulate that everyone can contribute.

Cities will be the starting point for defining the meaning of hyper-local content, as platform providers have recognized that it is more beneficial to establish the AR-layer in heavily populated areas. This will result in swift saturation levels in contrast to bringing populations to predetermined areas of content saturation.

This new level of shared experiences between urban inhabitants will create a new form of civic participation. The act of reshaping the mixed-reality urban environment will become an active part of urban life and the social interactions it permits.

Case Study Meta's LiveMaps

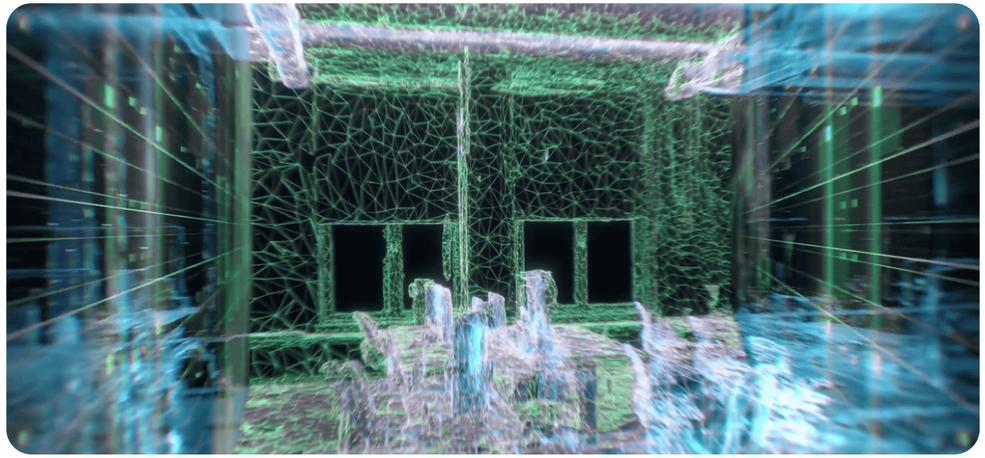


Image from Oculus / LiveMaps Demo

Reality Labs, a research division of Meta, has launched a new product called LiveMaps.

Reality Labs, a research division of Meta, launched a new product called LiveMaps. It is a 3D map of the world in order to offer a shared reality to its users, creating a digital layer that lays on top of the physical world by tapping into previously generated 3D content. This approach saves on computing power and allows the hardware to run on mobile chipsets without needing to reconstruct physical spaces in real-time. The potential of this project was presented in a promotional video, showing users receiving notifications from their AI assistants, chatting with a hologram of a family member in real time, and getting location-relevant information during a walk through the city.

Alex Himel, vice president of augmented reality at Meta, recently stated that they are planning to use advertising as their main revenue source but also plan to sell virtual goods, optional add-ons like cloud backup. Himel also said that ads would show up in space when you have AR glasses on, and their ability to track conversions should be close to 100 percent. If they hit projections, it will be a tremendous business, unlike anything we've seen on mobile phones before. Meta plans on controlling this business.

What does this mean for the AR-layer **of a city?**

According to an article discussing Meta's Reality Labs new product, LiveMaps, the author Conditt states that the company is trying to play "corporate God" by creating its own private reality that controls how information is displayed in the AR-layer. This private reality is a version of reality that is intimately tied to the company's incentives, rather than being an objective view of reality.

Meta takes the concept of "local" and decides what should be communicated to their user base, which could involve extreme personalization where each user sees a different version of reality that funnels them into a certain way of thinking. Alternatively, it could be a version of reality that is powered by corporate ideals, where content is placed by the highest bidder. For example, they may show movies playing at a theater that day, but instead of highlighting a local indigenous director's film, they may place Marvel's films in a more prominent position. They may also create an information hub in a local park about the flowers that grow there, but omit the fact that they're not indigenous to the area.

This version of reality is not necessarily correct, as it's a private company that decides what information is OK to broadcast about a particular location.

This building block is used to explore questions like:

- Should content be anchored to a location even if the contributor has never physically been there?
- How can local and community narratives be highlighted as the lens for which a place should be experienced?
- Who should contribute to defining what the digital layer should communicate about a place? Should that information be censored?

Why is this important?

The use of precise coordinates to anchor content can create a layer of digital information that affects how we perceive and interact with the built environment. While this technology can enhance our experiences, it can also be used to promote narratives that exclude certain groups.

To ensure that the augmented reality layer accurately represents the physical environment and does not perpetuate harmful narratives, we must understand how context affects design and communication within urban environments. It's important to be thoughtful about which digital layers are visible to users in a given space and how they affect their perception of that space. By being mindful of this relationship, we can work to reduce the harm caused by dominant narratives in augmented reality experiences.

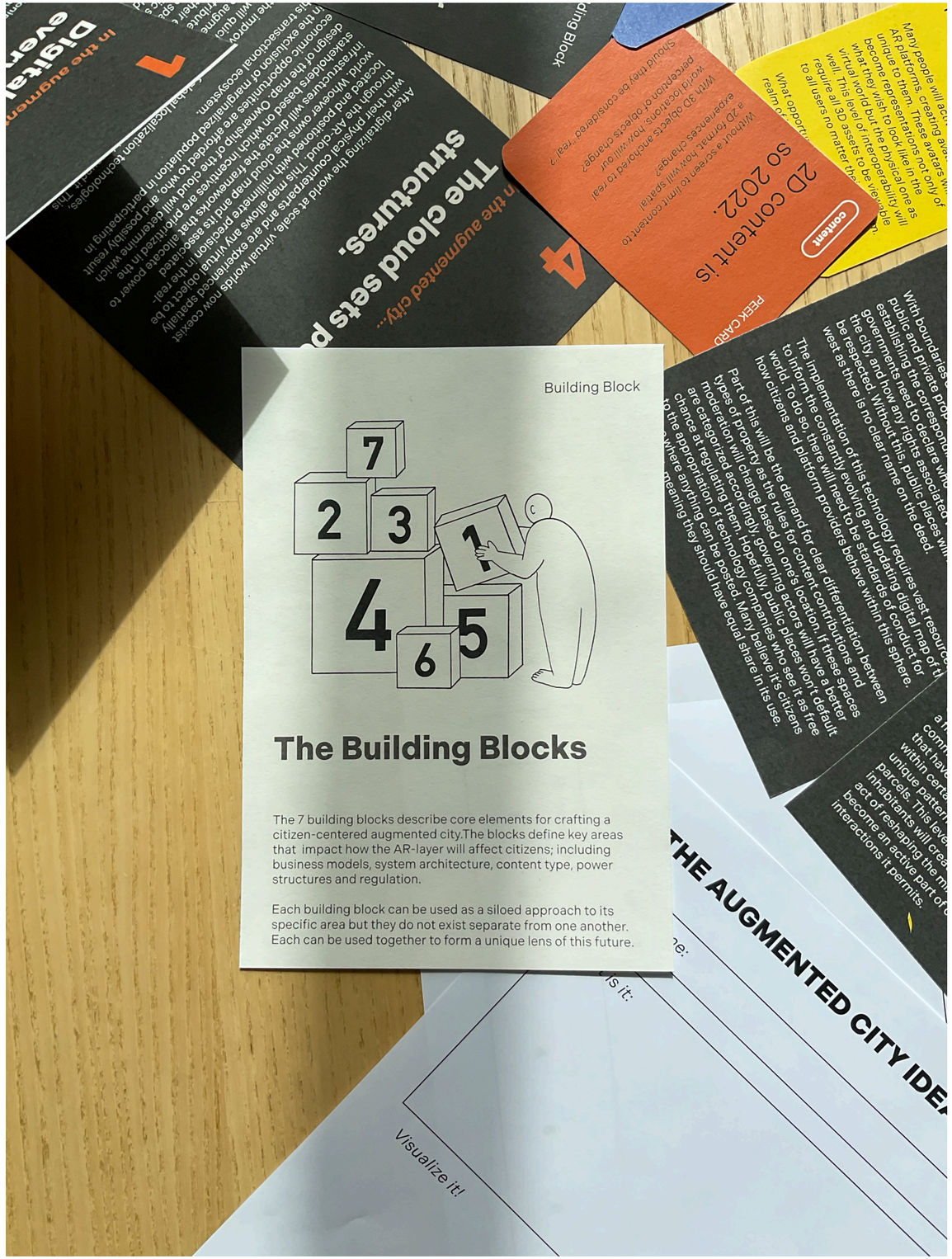
Defining Building Blocks
Summary

These seven building blocks describe one possible iteration of the augmented city. They are biased conclusions of themes that I believe will be key indicators in how the development of this technology will affect cities and its inhabitants.

Each building block can be seen as a siloed approach to its specific theme, however they do not exist separate from one another. Each building block can be used together to form a unique lens of this future. They are meant to serve as alternative views of the augmented city when they're compared to the dominant narrative in today's society.

What was that narrative?

The future of augmented reality in cities will likely see Big Tech holding a monopoly on the market, leveraging user data and profits while setting the rules of use with little regard for community impact. These platforms will function much like infrastructure services yet are there to advance their core business strategy; advertising. As they operate outside of current regulations, companies may continue to push boundaries with little oversight as legislation struggles to keep pace with technological advancements.



2 *Applying* **The Building Blocks**

The building blocks were used as the basis of the ideations. They crafted the augmented city with enough detail that scenarios and approaches could be more creatively depicted without having to define the platform's parameters in each idea.

From here, multiple methods were used to contribute to the ideations used to explore this layer of this speculative city.

The Peek Cards

Micro-brief as dark matter probe

I created a set of cards that listed various questions to serve as Dark Matter Probes, a method used in strategic design. This was used in coordination with the ideation tool “crazy eight” that challenges the designer to sketch eight distinct ideas in eight minutes. I would pull 1-2 of the probe cards to fuel ideations.

They’re called Peek because I wanted them to only offer a small snapshot of one element of the augmented city. Without needing too much detail beyond the building blocks and a peek card, I wanted to easily lead ideation sessions in new directions that dig into some of the dark matter that will lie behind the AR-layer of a city. Each card contains the same type of information; the category, title and leading questions. The cards are intended to be used as a means of re-directing attention into different areas by introducing small scenarios of future use-cases.

Basically, the building blocks describe the infrastructure of the augmented city while the peek cards are micro-briefs for designing it.

hardware PEEK CARD

Are you recording me?

Glasses, content lenses, smartphones. This hardware will all be nodes that add to the constantly updating map of the city.

What social contracts will be adapted for uploading places to the AR cloud?

What violations will occur in a constantly recorded world?

Digital Wastelands

What is the smallest scale a wasteland can be classified as? A street? A pixel? A neighborhood?

What is the opposite of an AR wasteland and does it have the same impact?

What are the characteristics of an AR wasteland?

content PEEK CARD

ISO: Full-time Pixel Scrubber

What new jobs will emerge in the public sector for managing the AR-layer?

How could "dugnad" be re-interpretted for doing community work for the AR-layer in your neighborhood, street or even building?

software PEEK CARD

Activate Child Locks

If everyone can contribute content onto a shared layer accessible to everyone, how will sensitive, graphic or violent content be dealt with?

Should children have a different type of access to the content?

What would parental locks look like in the AR-layer?

Digital Rights for Locations

What if public space was treated similar to citizens and had their own unique set of digital rights. What should be included?

Regulations like the right to be forgotten, the right to privacy, the right to reputation... how would these be applied to a physical place?

regulation PEEK CARD

This Is Not Permitted Here

What does civil disobedience look?

How do citizens lodge complaints? Who are the complaints going to, and who is responding to them?

What does illegal or suspect behaviours look like?

experience PEEK CARD

Ephemeral Content

Content in the AR-layer can't exist forever, there just isn't space. How should content disappear and what should the timeframes be?

How will the contents lifespan be communicated to viewers and contributors?

For popular content, how can it be re-posted?

hardware PEEK CARD

Introducing Gen-A

Children are quick to become native adopters of new technology. Augmented reality headsets and their triggers are no different.

We will see children becoming the augmented generation, who have developed new methods of intrinsically identifying types of content and their validity.

content PEEK CARD

Bots Infiltrate Grünerløkka

software PEEK CARD

Let's all watch Channel Zero

What does the base AR-layer consist of? Are there any restrictions on where and what can be posted? How are those enforced?

Who gets to see, contribute and edit the content accessible to everyone in the city?

If the layer goes offline, who is notified to fix it?

regulation PEEK CARD

Non Deep-Fake Certified ✓

experience PEEK CARD

The Branded City Twin

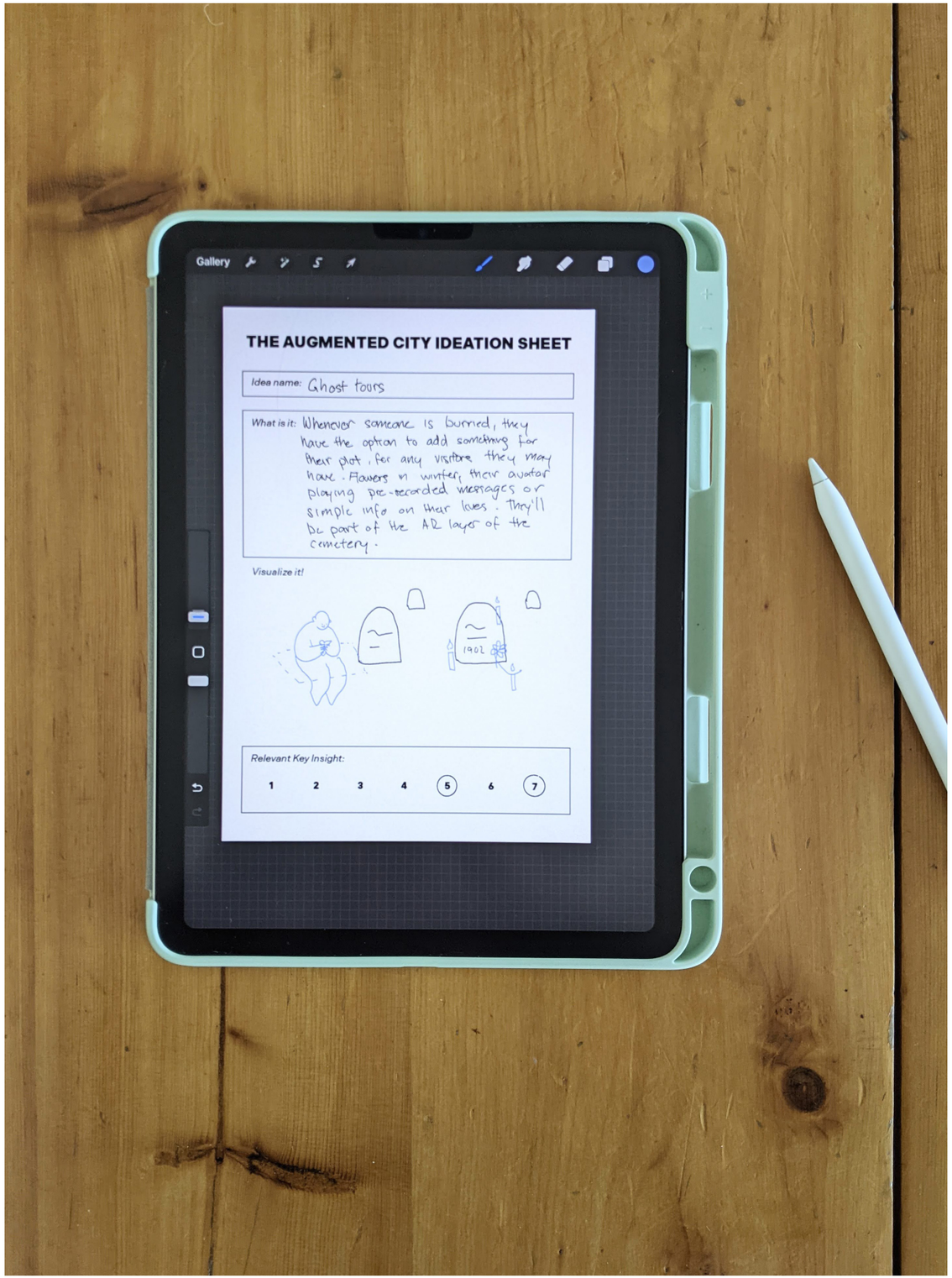
Through the AR-layer, cities have become brandable, where they strive to put their best digital foot forward.

What if all tourists visiting the city only had access to the augments the municipality have deemed acceptable. For urban inhabitants, they unlock the "real" skins of the city the longer they reside there.

AR - City Worksheet

Ideation Tool for Ideation Phase

As I wanted building blocks to create the basis of the ideations, I tried to format all the ideas into a single worksheet where I could describe, visualize and name the idea as concise as I could before stating which building block I thought it related to. This was also done to later see how many ideas were relevant to each block.

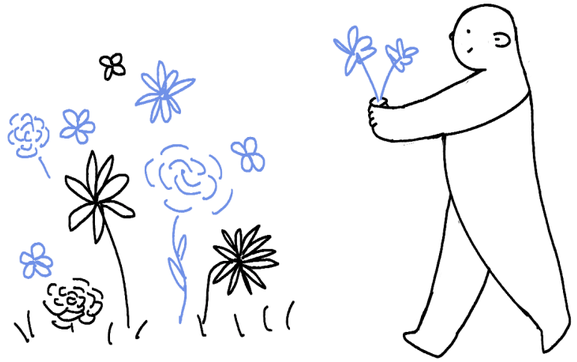


THE AUGMENTED CITY IDEATION SHEET

Idea name: Secret garden in bloom

What is it: AR could be used to create a virtual secret garden in a public park. Citizens will see a hidden world of floral and fauna as they stroll, with extra information from the local museum. Citizens can "pick" a flower to place in their home for the next 24h.

Visualize it!



Relevant Key Insight:

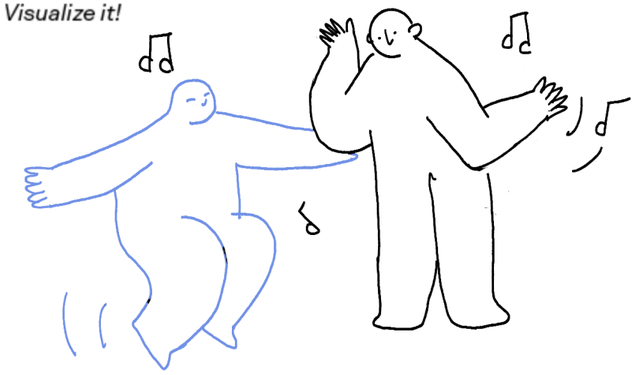
1 **(2)** 3 4 **(5)** 6 **(7)**

THE AUGMENTED CITY IDEATION SHEET

Idea name: Let's Dance

What is it: After a 20:00, theres a local dance party planned in a park to celebrate summer. While people arrive, they see dancers move to the music qued for when you enter the boundary. Visual + audio AR helps you dance all night with neighbors and digital avatars alike.

Visualize it!



Relevant Key Insight:

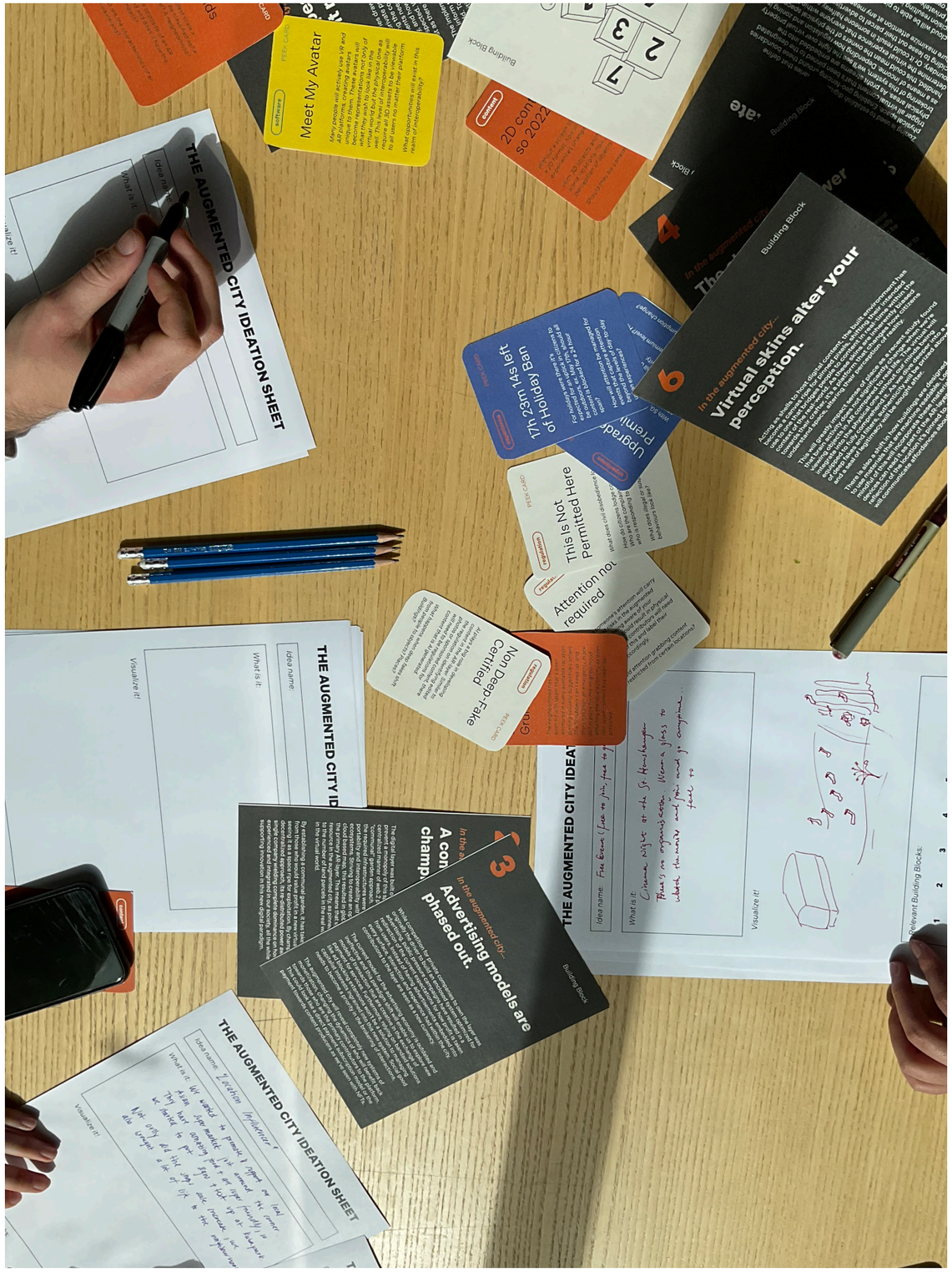
1 2 3 4 **(5)** 6 **(7)**

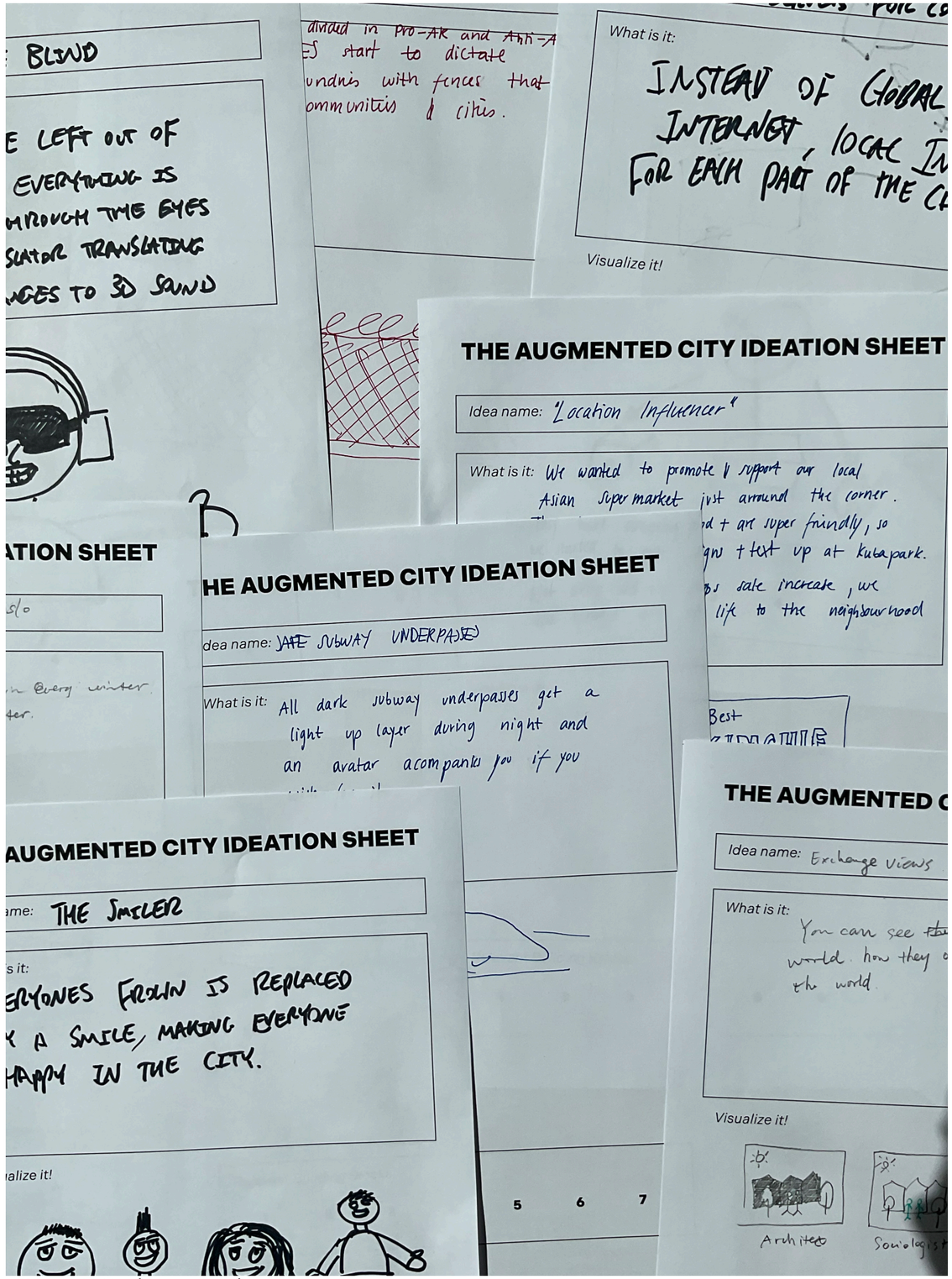
Ideas Workshop

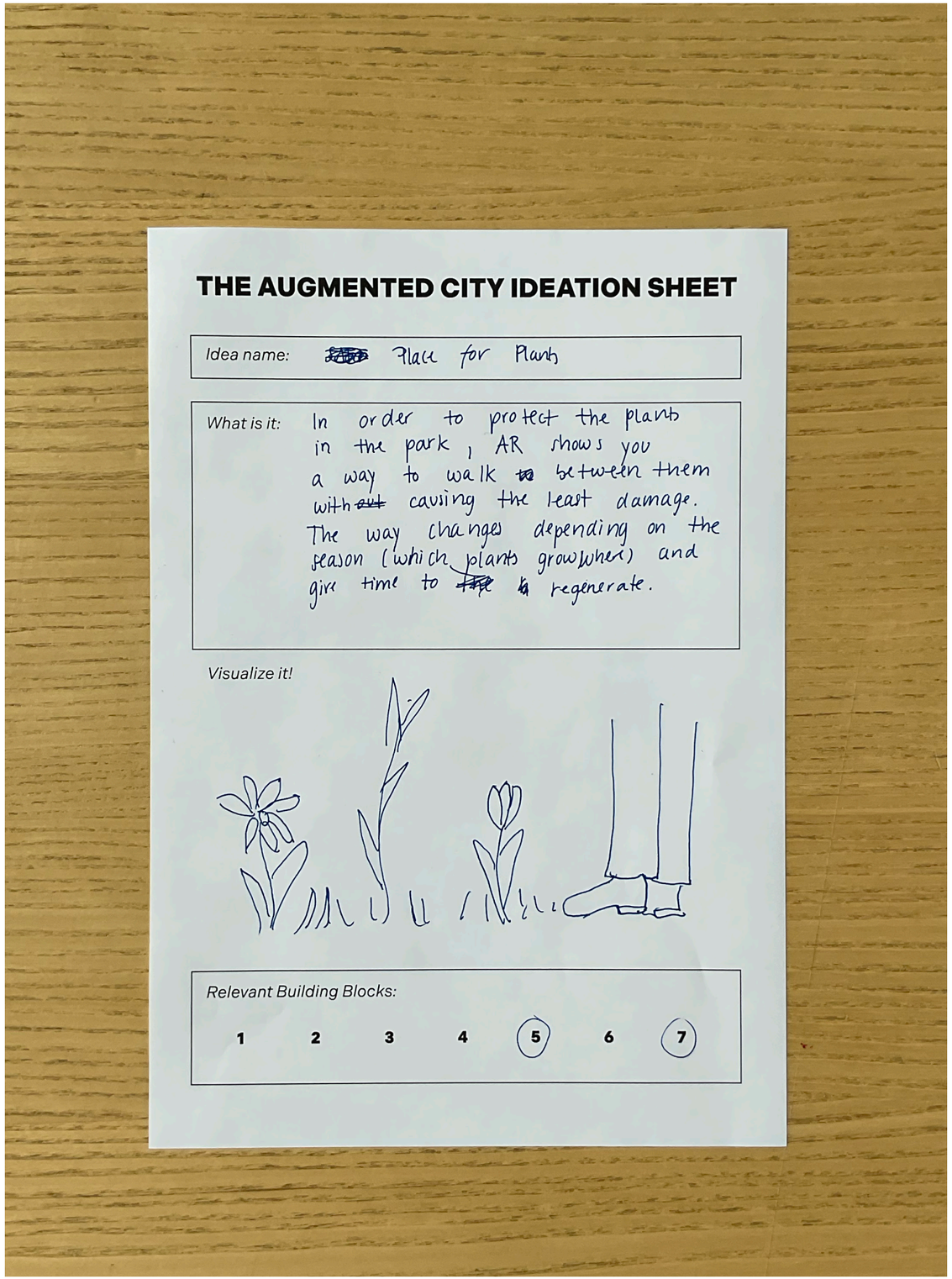
Method of Generating Ideas

I organized a workshop with two designers and two architects, where based on the peek cards we developed quick sketches on urban AR experiences. I described the augmented city based on the building blocks outlined in the previous section. From here, I asked them to draw 1-2 peek cards and create as many ideations as they could via the ideation sheet or post-it notes they could within 8 minutes. Having architects part of this stage was important to me as I believed they will be equally important contributors to the management of the AR-layer, and the technology will heavily impact their field.

I took ideas from the session and built upon any I thought either exemplified the theoretical framework or could be re-worked to better embody it.




BLIND
E LEFT OUT OF
EVERYTHING IS
MROUGH THE EYES
SLATOR TRANSLATING
NGES TO 3D SOUND
What is it:
INSTEAD OF GLOBAL
INTERNET, LOCAL IN
FOR EACH PART OF THE C
Visualize it!
THE AUGMENTED CITY IDEATION SHEET
Idea name: "Location Influencer"
What is it: We wanted to promote & support our local
Asian supermarket just arround the corner.
nd + are super friendly, so
gnu + text up at kubapark.
s sale increase, we
life to the neighbourhood
Best
THE AUGMENTED CITY IDEATION SHEET
Idea name: SUBWAY UNDERPASS
What is it: All dark subway underpasses get a
light up layer during night and
an avatar acompanies you if you
AUGMENTED CITY IDEATION SHEET
ame: THE SMILER
s it:
ERYONES FROWN IS REPLACED
K A SMILE, MAKING EVERYONE
HAPPY IN THE CITY.
alize it!
5
6
7
THE AUGMENTED C
Idea name: Exchange views
What is it:
You can see
world. how they
the world.
Visualize it!
Architec
Sociologis


THE AUGMENTED CITY IDEATION SHEET
Idea name: Place for Plants
What is it: In order to protect the plants
in the park, AR shows you
a way to walk to between them
with cut causing the least damage.
The way changes depending on the
season (which plants grow when) and
give time to to regenerate.
Visualize it!
Relevant Building Blocks:
1 2 3 4 5 6 7

Applying Building Blocks

Summary

I created multiple tools to help me ideate on how AR could work in the augmented city. This helped me stay focused on the scope of the project, which tried not to veer too much into the hardware or software technicalities.

As so much information is needed to understand this version of the augmented city, I found the workshop participants had a hard time following along with the building blocks and peek cards. If I were to do this again, I would find a more effective way of applying the tools in the session so we didn't need to spend as much time on stating the context.

One aspect that emerged from developing these tools is the fact that all ideas seemed equally relevant. While I chose a few ideas to take further into the prototyping stage, I think it was a really fun and interesting thought exercise to let loose and speculate on this world with people from different backgrounds.

3 *Evaluating*
The Building Blocks

Based on how the blocks were visualized through scenarios and ideations, I wanted to go further and find threads for how these blocks could be implemented in a way that exemplified the original theoretical framework; the right to the city and the right to the surface.

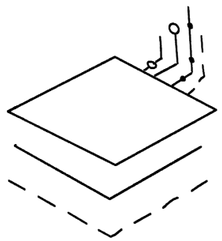
After a few rounds of synthesis, elimination and refining, a set of rights emerged. These rights describe how citizens could be prioritized in the building of this layer. The emerging digital citizen of the augmented city should have the right to: Access, Contribute, Context and Protection.

The right to

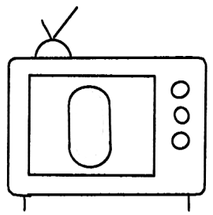
Access

There will inevitably be private companies who offer paid experiences within the AR worlds. However, the primary channel which hosts the majority of citizen contributions, as well as any information from the municipality itself, will be considered digital public infrastructure.

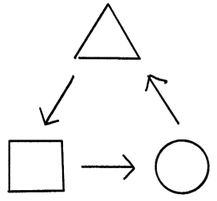
Oslo is one of the most indexed cities in the world on the web, and is a leader in implementing connectivity technology within the city. Since the layer is accessible through smart phones, in addition to more AR-centric hardware like glasses and lenses, accessing this layer will be attainable to a broad range of citizens. While everyone has the basic right to access Channel Zero, they are also able to “pay” for premium services with the resources they have available (currency, time, participation). By establishing basic access as a right, it will shift the frameworks for the controlling companies for how they design the system architecture. It will also support the need for a single shared channel, where all citizens have access to the majority of the same content pinned within their city, ensuring personalization does not isolate citizens into their own echo chambers.



Digital Infrastructure



Oslo’s Channel Zero



Interoperable Systems

The community garden club has included all of the flowers and fauna that have been planted in the shared boxes, so people can see what to expect from the garden in the upcoming months. They also offer their own branded flower bouquet as a digital item, where the proceeds go directly to funding the club. The flower can be brought home and displayed in the home, or planted somewhere in the city. The flower will communicate that it's from this neighborhood club.

This park is right beside a private street, where content has been prohibited due to zoning rights attributed to private space. For that reason, content stops at the boundary line.

NRK has added an immersive experience in parks around the city as a way of promoting a new show. It's on channel zero and free to see, however HBO MAX has also added collectable gemstones as a way of incentivizing their subscribers to relate to the latest episode of their popular show. It's a premium subscription and only offered to paying subscribers, however everyone can see that there is HBO paywalled content in that location. To do this in public space, the streaming provider pays tax to the neighborhood digital fund as a way of occupying that space from citizen content.

How does this relate to the right?

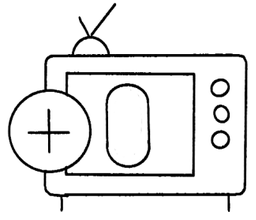
While there are some components of profit integrated into the AR-layer, the base city channel believes that citizens have the right to access it free of charge. This means that while the content is not moderated, approved or of highest quality, it makes this layer more democratic for people to engage with the digital layer that most people have turned on. It's a way of shaping the city without the need to subscribe to a tech company promoting their latest app or device.

The right to

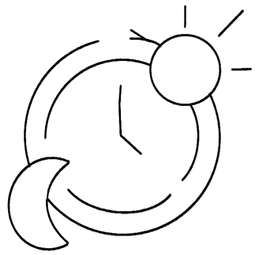
Contribute

Public places are known as being a space for debate, dialogue and conversation. This shouldn't be restricted in AR. For zones considered public space, citizens are free to contribute in whatever way they see fit to the shared digital layer.

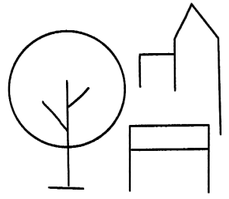
While this may result in content not suitable for children, the ephemeral nature of content will reduce the concern that's commonly associated with non-monitored spaces. Experiments for potential blocks will be embedded into the system, for example banning explicit sexual content, but the current standards of moderation will be reduced to enhance public discourse. Additionally, questions of moderation that are considerate of cultural and social norms of a place will be enforced by citizens in how they prolong or remove content in the layer. This way it won't create a global standard for ruling for what's appropriate for different communities. It localizes it from the perspective of the people directly affected by it.



On Channel Zero



24 hour contributions



Public Zones

Some teenagers posted their initials and date of where they first kissed on a park bench near their house. It's only up for 24 hours but they wanted to take a photo with their graphics and post it to their socials.

The city of Oslo has a hologram of a local hero, who the bench was named after. People who go close enough to the bench can see him and hear a short description of why he was considered a prominent man in the community (if they have the audio layer activated as well) before he fades away.

A local business owner goes on a walk every morning where she pins her branded content that promotes the local honey that just arrived in her boutique cheese shop. She gives a discount code to her neighbors in an attempt to bring in more business.

A child recently had a birthday party in the park, and the parents added some stock content onto the place to make it more festive. They organized an AR game, running around catching PacMan as well as a petting zoo with virtual animals the kids made with the app MonsterMaker. It's a more cost effective alternative to hosting a birthday party, and the kids love it since they get to run around outside. They also make sure to add large content in vertical land parcels so the kids will see balloons as they walk up to the park.

How does this relate to the right?

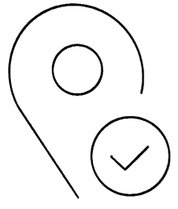
Every citizen has the right to contribute to the base layer of the augmented city. This is free for everyone to see and add content onto. If they want to pin content to a certain location, they have to follow a few rules. All content will only last for 24 hours unless it's been re-posted or upvoted by other citizens. If pinned content receives 3 complaints by different citizens, it's removed from the layer.

The right to

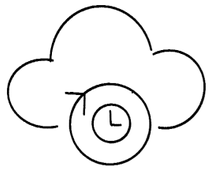
Context

While everyone has the right to view and contribute to the AR layer, the contributor must check into the zoned location that they intend to post in. While zones and boundaries have become micro in scale, contributors only need to be within a certain range to register a check in.

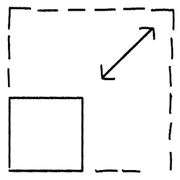
The augmented layer will directly impact how the city is perceived. For this reason, content contributors must be familiar with the context of the environment they post in. Having this tries to ensure the layer does not simply prioritize contributors who have the resources to develop a plethora of content that can be re-used anywhere in the world by posting remotely. Content will be localized, and should be made by locals.



Location verification



Ephemeral and Stable Content



Micro-Zones

A tenet in the apartment building is renovating their home, and has the trash bags outside on the street during the demolition phase. They've covered this with one of Oslo's bank of commissioned artists murals that are free to post from citizens. They've requested an extension to the standard 24 hour timeline of content, as they plan to have the bags there for 1 week.

This building is a heritage building and while privately owned, is considered to be under the domain of public property when it comes to the AR-layer zoning distinctions. That means that the building is free to paint by citizens with whatever content they'd like as it's considered part of the city.

Graffiti artists have capitalized on their skills of being able to paint the city in a much faster timeline than they would previously via spray paint. The newest trend is to have the content interact with another artist's existing tag as a way of painting over it without ruining the work.

Through the tunnel, is a local coffee shop with outdoor seating. They've tried to make this passage part of the overall customer experience and have information about their shop as people walk through. Since flowers are blooming late this year, they've also added a large scale flower arrangement above the outdoor seating to make it a "postable" experience on socials.

How does this relate to the right?

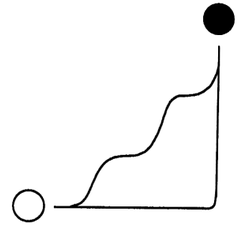
Context is everything in the augmented city. To work towards having content posted by citizens and not bots or people halfway across the world, there are protocols in place for people to "check in" or verify their location. They also need to be within a zone designated as public property since not everyone can pin onto privately owned digital zones. They must be within a 500m radius of where they plan to pin content or have been there sometime in the previous week for any planned content posts. This will make it more relatable and hopefully have the contributors have a more vested interest in the social and cultural good of their community (to prevent violent or sexual content to be posted).

The right to

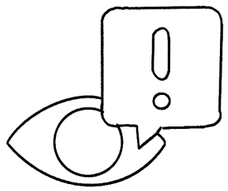
Protection

If everyone can post anywhere the zones allow, there will be unlimited levels of content that saturate and overload the visual and audio capacities of many citizens.

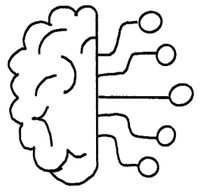
AR should be piloted slowly, street by street to begin indexing the areas that are expected to receive most interaction. By doing this, Oslo can experiment with safe levels of content that don't distract or disturb citizens while out in urban public spaces. Dynamic and innovative approaches will need to be tested for situations where content is maxed out, but citizens who would like to still post will need to be considered. Beyond that, attention will become further exacerbated as 3D and spatial content take over what was formerly static environments. With interactive and constantly evolving content, we'll see new social contracts and regulations for how attention can be captured and its impact on both the community and individual levels.



Saturation Levels



Attention Impact Assesment



Considering Perception

The municipality has created covers for common signage like street signs and crosswalk lights for citizens not driving or biking. They are automatically applied to these areas, however can be overridden if a citizen would like to replace it with their own post. If it is not information based, all content from the municipality can be traded for citizen-based content.

An art gallery has scaled up one of the pieces and placed it outside the walls of the storefront, as well as painted the street with the artist's signature style and name. They've posted this initially for the opening but have refreshed the content whenever they have opening hours.

Children from the local school have decided to paint the trees, and are on a mission to go around and identify each tree in their neighborhood before adding their own artwork on it. It's part of the new curriculum on sustainability and teaching children about how to care and treat plants in their city.

As this is a busy intersection during rush hour, content saturation is reduced from 90% to 30% as the stimuli of the environment is increased. This only applies to the main street for traffic and side streets maintain 90% saturation levels.

How does this relate to the right?

Accessing Channel Zero has been banned for anyone who is operating a vehicle, as the risk for distraction or injury is too great. For that reason, all car-related infrastructure located within public space is transformed into more pleasurable graphics in the AR-layer for pedestrians. However, care is still taken at crosswalks to ensure there are limited distractions for everyone involved in city traffic.

Streets are public space, however typically the store owner or building owner will be able to post content to the area outside their space. Otherwise, citizens can post whatever they'd like!

The core finding from this project

Citizens have the right to the augmented city.

This project has argued that if citizens have the right to the city, they will also have the right to the augmented layer of their city, especially as it relates to public space. In the implementation of augmented reality in cities, the digital layer will become an important infrastructure similar to digital platforms today. This will significantly impact how citizens shape their cities and how the cities themselves function.

To ensure citizens have a right to this layer, I argue that the digital twin of public space on the AR cloud should not be sold by or to private companies. The commons belong to citizens, and any profit generated from digital boundaries should also belong to citizens. The digital layer must be transparent in communicating the zoning boundaries of public, private, and privately-owned public spaces. Different types of spaces will have their own set of content regulations based on ownership rights. This will work towards making public places areas free from the requirement of consumption, especially if regulations are in place for managing how content is placed in parks, streets, squares, and other public areas.

By valuing the digital layer in parallel with the physical environment, we can work towards establishing the AR layer as a new dimension of space in cities. This will enable municipalities to critically approach its development based on how it affects citizens, the city, and its larger systems, particularly during placemaking and place maintaining initiatives. Using placemaking and the "right to the city" as a lens for evaluating this technology, opportunities for how cities can approach this emerging problem can be identified.

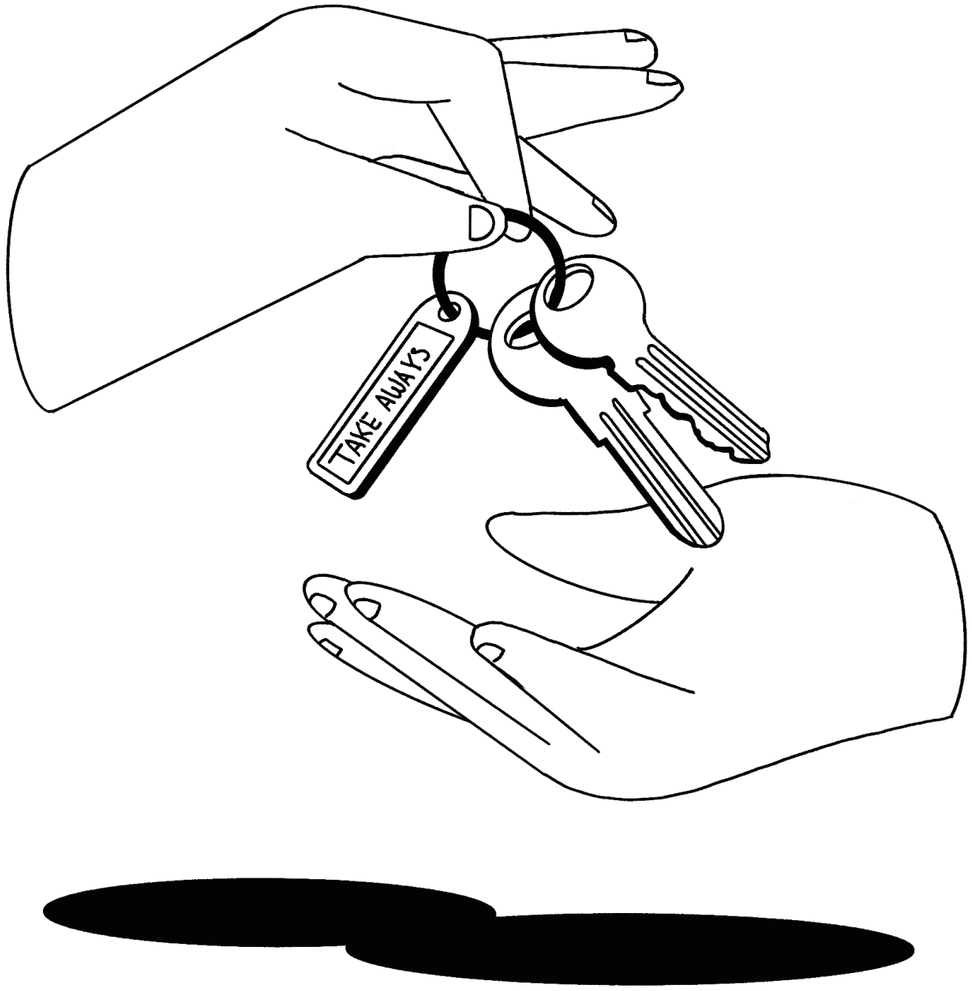
The digital layer is a new domain of citizenship that directly impacts how citizens perceive the real world and how they live within it. Cities must consider the rights of citizens before cementing the AR-layer in place, which will enable them to proactively build a digital public infrastructure that addresses issues seen in today's digital platforms. Design will play a crucial role in shaping this future, and it is up to us to ensure that it has a positive impact on society.

5

REFLECT

This chapter reflects on the diploma deliverables through peer evaluation, personal reflection and final take-aways.

Key Takeaways



1

Digital platforms are increasingly integral to urban experiences and impact how cities' are used and experienced. In cities, the importance of digital is becoming equal to that of the physical, and both should be regarded accordingly in how it impacts citizen inclusivity.

2

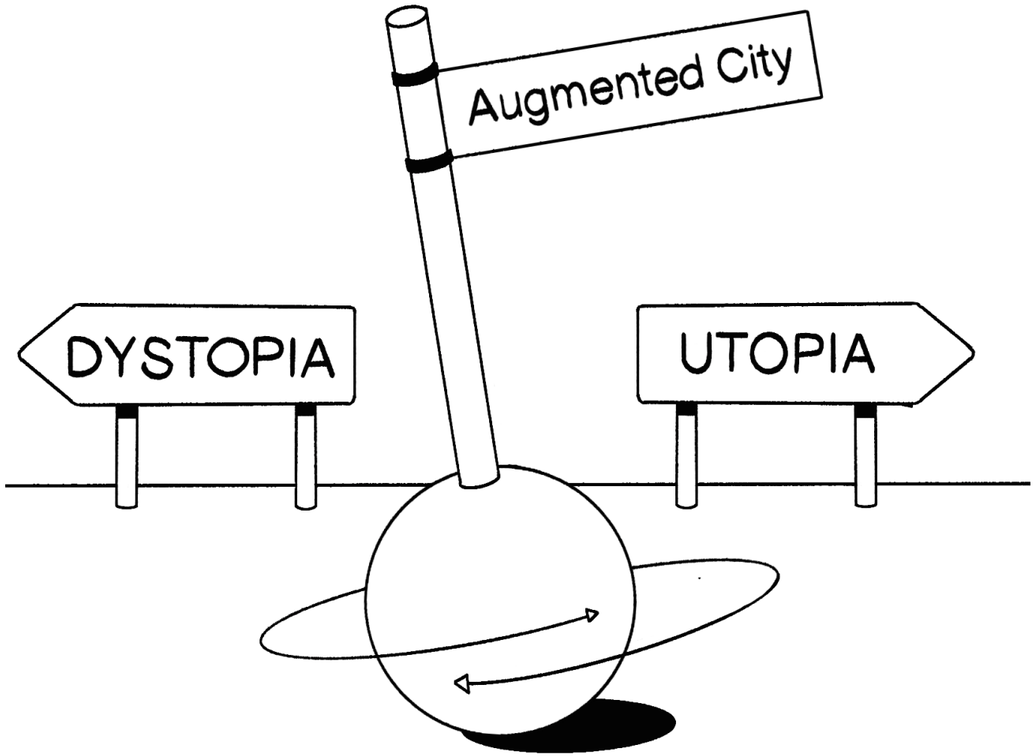
Current narratives of this future typically veer towards extremes -- from a dystopian future of advertising and surveillance to one that turns the world into a constant state of play. I wanted to explore what futures that lie in the middle could look like, without exemplifying the values that will inevitably stem from Big Tech and their approach to the AR layer. Design fiction can be used to visualize this future, using interaction design methods to help spur questions related to the frameworks that will build this future.

3

Narratives often center around the individual experience, but the collective experience also needs to be considered. Throughout this report, you may have noticed that I rarely use the term "user." Instead, I use the term "citizen(s)" as I believe this terminology is necessary to distinguish between the individual and the community. These terms are often seen in contention with each other, and I think it will be increasingly important to consider designing for the community or city as a whole rather than just a single user. This will result in a drastically different AR-layer design.

4

Designers should be critical of their involvement in developing this technology while it is still malleable. Design choices are political, and all disciplines should actively shape the discourse of augmented reality and the potential implications of its implementation in cities. Design will play a key part in this and should be critical of how their design choices may result in excluding certain people.

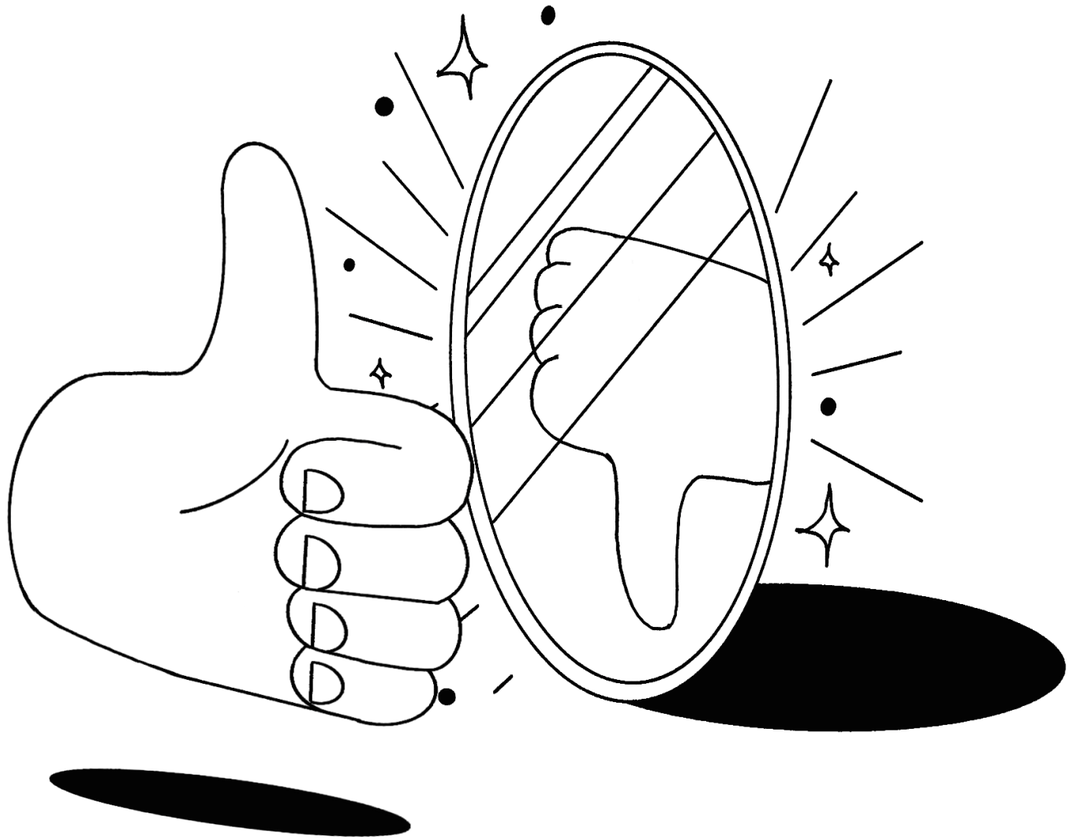


Ways Forward

The principles should not be confused with the "ideal" approach to designing the augmented city.

Situating this possible future in the context of the "right to the city" and placemaking was a strategy to incorporate perspectives that were often overlooked in my research on how the AR layer would be implemented in cities. By reframing the technology to consider this framework, it enabled exploration of opportunities that embed collective urban values into the design of this system.

The augmented city could manifest in various ways. Without careful consideration from citizens, regulators, municipalities, and private actors, the platforms by which the city is built will look significantly different. Therefore, several disciplines need to be critical of its implementation from the start to ensure that we do not repeat the negative impacts that are common in digital platforms today. This project is my contribution to that discussion.



Reflections

Overall, the diploma has achieved the initial goals that were set out for it. I wanted to explore a subject matter that I am passionate about and potentially add something to the general discourse. I am satisfied with the project's deliverables, but there were quite a few weaknesses in the project. Here are four points I would improve on.

1

While this project attempts to explore what a future augmented city could be like, it does so from a biased perspective. It makes sweeping declarations of rights that apply to citizens living in a highly digitalized society, one that is quick to adapt to emerging technology. I wrote this diploma through my lens of understanding; being a white, privileged woman in the Global North (Nordics in particular). All contributions to the discourse on a socially sustainable AR layer should be read accordingly, as this project heavily leans towards my bias.

2

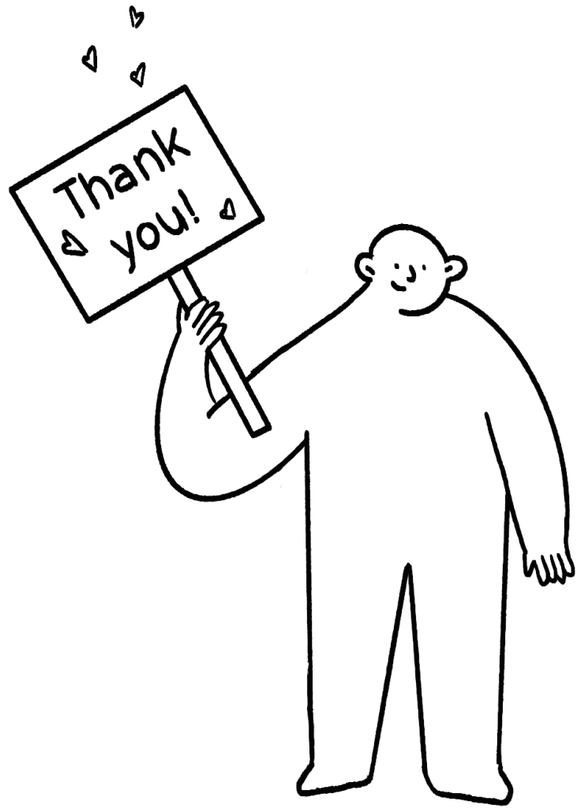
This project intentionally did not cover personalization, the digital divide, or the technical (hardware, software, and interaction) requirements of the technology. I felt that covering these areas could quickly shift the project's focus, so I chose to exclude them beyond a basic understanding. This does limit the overall view of the world I created for this project due to the restrictions in scope.

3

The speculative nature of the project, and its expected ubiquity, resulted in not having an accessible sample of users to test with. For that reason, this project relied heavily on expert interviews and academic papers as a means of formulating foundational knowledge. This is a definite weakness for a project that proposes to uplift citizens and excluded communities.

4

This project exists in a snapshot of time and may become outdated as the technology progresses. While the principles may become irrelevant, I do believe the driving frameworks will be topical no matter how this technology is implemented.



A big thanks to my supervisor Einar Sneve Martinussen who provided valuable support and feedback throughout this diploma process.

Joakim Formo for providing feedback whenever requested.

I would like to express my gratitude to all of the expert panel who agreed to be a part of this project. Without your contributions, the research would not have been possible. The expert panel: Cody Turner, Matt Webb, James Fincane, Clara Julia Reich and Emma Arnold; for your contributions and invaluable perspectives that helped develop this project.

I would also like to thank my family & friends for all their love, encouragement, and support.

“The city, like the surface, should not only be a space for consumption, but an everchanging reality that results directly from individual acts of production, participation and appropriation created by its inhabitants.”

The Right to the City Is the Right to the Surface by Sabina Andron

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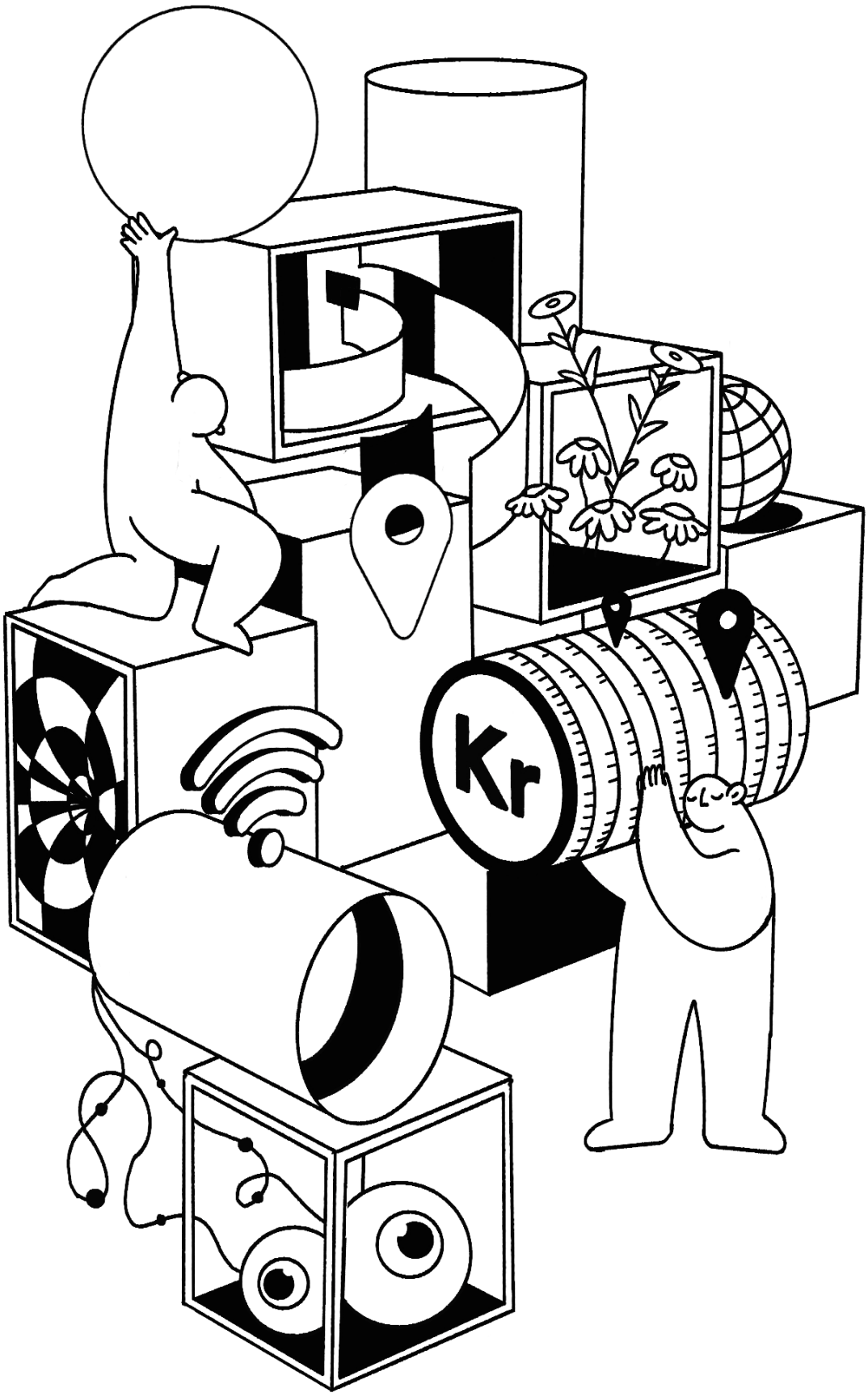
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