



Urban
Interaction
Design



Towards
City Making

The graphic consists of three overlapping circles. The outermost circle is green, the middle one is blue, and the innermost one is red. They are all centered on the page and overlap significantly.

Urban Interaction Design

Towards City Making

2014, Amsterdam

Foreword

How do you describe emerging trends within a forming field? In this case, it was done by bringing eight people together in a remote German castle, all from very different backgrounds but a shared interest in urban interaction design, and giving them four days to describe this field. As a book.

With this inception story in mind, what you will find is a distilled conversation, filtered through the collective and embodied practises and experiences of these quite diverse individuals. We cannot claim that the result is a perfect representation of the current situation. You could claim that it is pretentious or even preposterous to make this attempt under the given circumstances. After all, all text and illustrations were produced in less than a week.

However, because of the experience, commitment and generosity of the contributors, this book does now exist. We have, in our hands and online, an attempt to characterise and discuss the emerging trends within urban interaction design, freely available for anyone to read, reflect upon and improve.

I like to think of it as a guidebook, a cheap, rugged companion to a brisk walk, or a run for your life, in a somewhat unfamiliar territory. You may already know how to find your way around, easily identifying some elements, but you picked up the book because you do not feel entirely comfortable with your mental map of the area, and you are not sure you can discern the salient features consistently enough to save you the pains of acting on a misinterpretation. Others may even rely on your advice.

This is the intent and purpose of this book: to give reflected directions. No more, no less. Use your own judgment—that is what we did—and share your findings with those who walk in your footsteps. Thank you in advance for your help, too.

It is also a Thing, in the Latourian sense that it is an artefact which creates a possible meeting place for people to engage in a deliberative dialogue around it. A community of readers. That is also reflected in its somewhat essayistic nature. Please treat it as an opportunity for further discussion, not a definitive answer to a problem. Specifically, we encourage you to read and edit the Wikipedia entry.

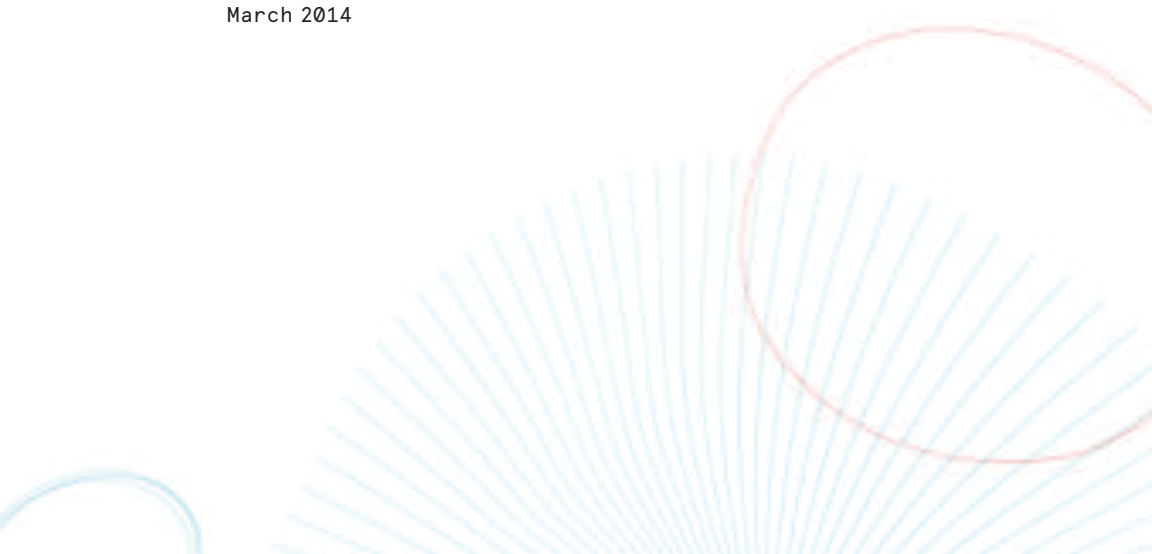
This publication is the result of the interaction between two projects: the UrbanIXD project, with the subtitle 'Designing Human Interactions in the Networked City', and the Book Sprints for ICT Research project organised by the FLOSS Manuals Foundation. Thereby, it is also a case of two network organisations partnering up to address an issue of pressing societal urgency, using the Book Sprints methodology developed by Adam Hyde.

I am deeply grateful to the contributors of this book: Juan Carlos Carvajal Bermúdez, Manu Fernández, Henrik Korsgaard, Ingrid Mulder, Katarzyna Piskorek, Lea Rekow, and Martijn de Waal, for saying yes when I asked if they would take part in this Book Sprint, and for spending so much energy and resources without knowing what would come out of it. Also an immense thanks to the Book Sprint facilitator Barbara Rühling and the rest of the Book Sprints for ICT Research team: designer Henrik van Leeuwen, editor Rachel Somers Miles, organiser Donna Metzlar, project manager Tania Goryucheva, researcher Rachel Baker and programmer Joanna Paulger for supporting the whole process so professionally and kindly, and for giving us the opportunity to work with you, and in this way. Finally, we should all thank the coordinator of the UrbanIXD project, Michael Smyth, and Ingi Helgasson for initiating both the UrbanIXD project and the Book Sprint collaboration.

On behalf of everyone involved, I hope you find the publication useful. It is a product of a collaborative writing and editing process, so all elements have gone through many iterations and hands. The authorship is therefore shared. Please use the references and links at the end of each chapter to find sources to other work that helped us shape the interesting and perhaps important topic of emerging trends in urban interaction design.

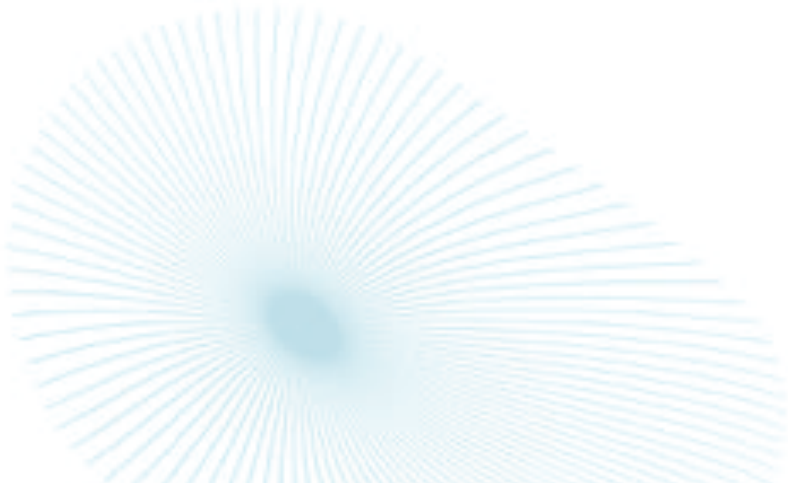
Martin Brynskov

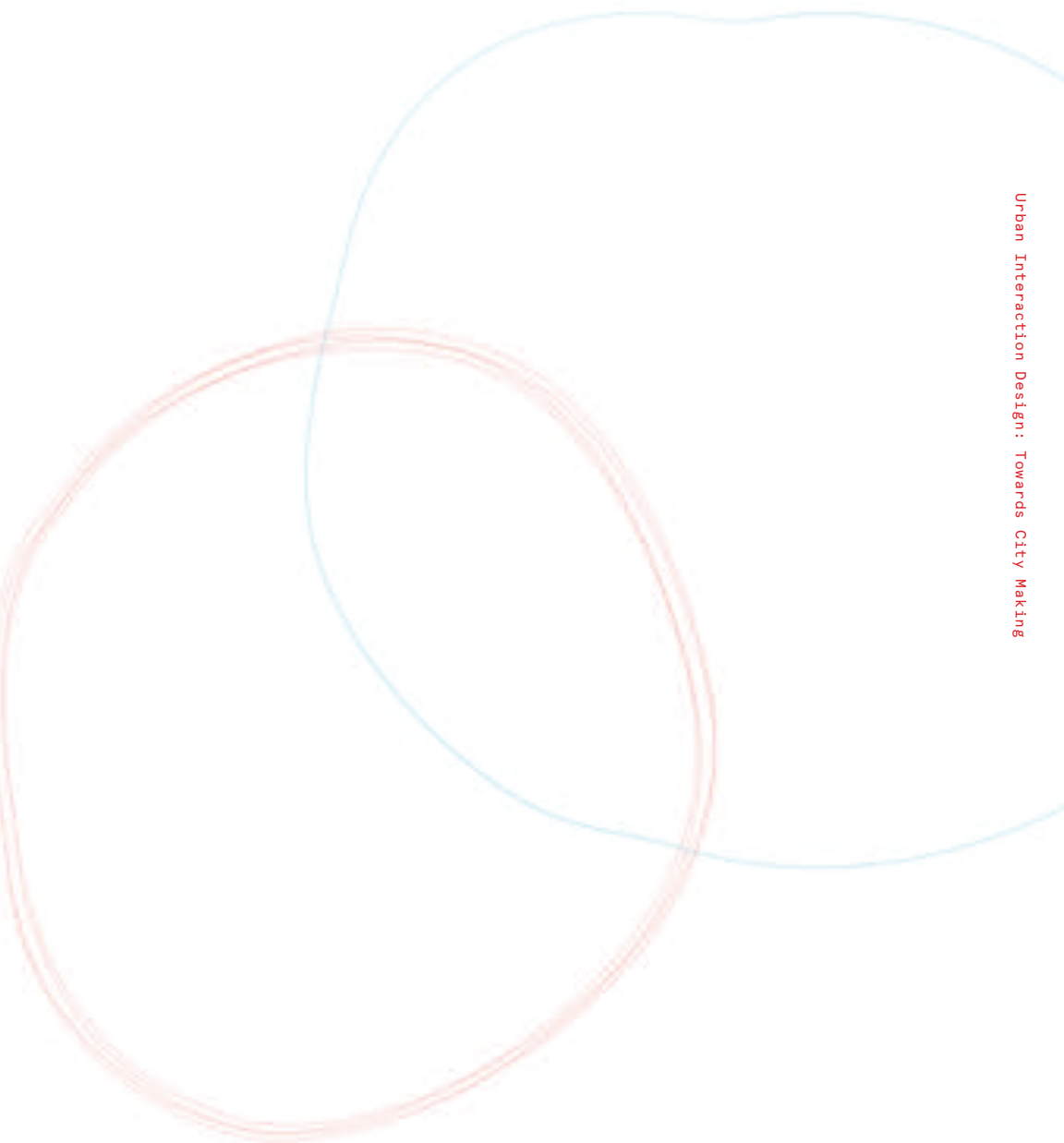
Schloss Neuhausen, Germany
March 2014



Index

Foreword	1
Introduction	4
Foundations	8
Becoming a Field from Many Traditions	10
Approaches and Methods	12
The City as an Urban Interaction Design Platform	20
Illustrating the Confluence	30
Trends	38
Amateur Professionals Reshaping Cities	42
Rethinking City-Making Institutions	52
Urban Product and Platform Reciprocity	58
Sharing Tools for Sharing	68
Designing for Digital Ownership in Cities	74
Conclusions	80
Contributors	86
About the Writing of this Book	90





Introduction

What is Urban Interaction Design? Obviously, it has something to do with the three separate terms that make up the name of this emerging field. It's about the interaction of humans with their urban surroundings. But hasn't that always been the core concern of urban planners?

Sure.

However, what we have observed is that 'the making of the city' is no longer just their concern. And no longer do their methodologies, expertise, and theories suffice to address the complex issues of the 21st century networked city. That's why increasingly we see designers of all sorts, IT specialists, urban anthropologists, philosophers, HCI researchers, artists and sociologists teaming up in coalitions that up to a few years ago were unthinkable.

Why? Call it the hybrid city, the sentient city, the media city, or whatever you want: what has changed in the last decade is the rapid technologisation of everyday urban life. It is through the interfaces of our mobile phones that we make sense of our surroundings, at the same time connecting the local with the global. Similarly, cities and governments have—often with the help of companies—started to collect all sorts of data about urban life, ranging from air quality to traffic congestion. Willingly or unwillingly, pervasive technologies have become part of our everyday experience. Software is now organising urban life as much as the programme of urban designers.

This is the situation that urban interaction design is a response to. Its practitioners provide citizens with ways to make their everyday urban experiences more pleasurable, interesting, productive and efficient. At the same time they also design the interfaces that help citizens to understand the salient features of the layers in the networked city, and let them organise themselves around these for whatever matters are of concern to them. They come up with platforms that help citizens govern their cities from a public interest perspective, in collaboration with other stakeholders.

It's a field that is not just about producing services or tools that optimise urban life as it exists. An important part of it also consists of dreaming up alternative futures. The latter is of great importance. The rise of new media technologies opens up opportunities for citizens to organise themselves in communities or political movements to improve their cities. Yet at the same time, there is also a risk that this new software layer and the interactive services geared towards the city will be designed or appropriated in a closed manner that excludes particular uses or groups, or will prioritise economic profit above societal benefits.

What's at stake here is not so much a battle between beautiful bottom-up and terrible top-down. Between the citizens and the system. Or between commercial and non-profit. Bottom-up initiatives can be exclusive or just seize resources for the benefit of their own group, bypassing democratic decision-making processes. And top-down initiatives can be aimed at improving transparency or providing the means for projects that benefit the urban community at large. What's important is not so much the organisational structure of the project, but its rationale: in what way does the application of these new technologies serve human and societal needs?

The design of our cities and the way we govern them, and the tackling of complex or 'wicked' urban problems thus requires the need for an integrated approach that combines the knowledge of technology specialists, explorers of urban society, and people with strong competences in the fields of media, art and design—with a deep emphasis on the human scale.

Moreover, it's not just enough to bring experts of various disciplines together. Developments in digital media have also democratised access to all kinds of tools, empowering organisations, companies and citizens in many ways to take matters into their own hands. This means that a successful process of urban interaction design also needs to take these actors into account, not only as stakeholders, but also as potential co-creators, working with—and against—each other in voluntary or forced partnerships.

In short, urban interaction design is not only about the coming together of various disciplines in addressing urban developments, but also about finding new relations between professional designers, academics, policy makers and citizens, in a shift that we may describe as moving from a process of 'city management' to one of 'city making'.

This book is an effort to explore the newly emerging field of urban interaction design that addresses these issues. In the first part of the book, 'Foundations', we look into its origins. Where do its practitioners come from? How are they working together? What methodologies do they bring to the table? What are the key concepts they are addressing in their work? In the second part of the book named 'Trends', we go into current developments in the networked city and how urban interaction design as a field addresses these. Taken together, these sections will not give the definite definition or overview of this field. But hopefully there's enough in here to convincingly claim that the further development of the field matters.

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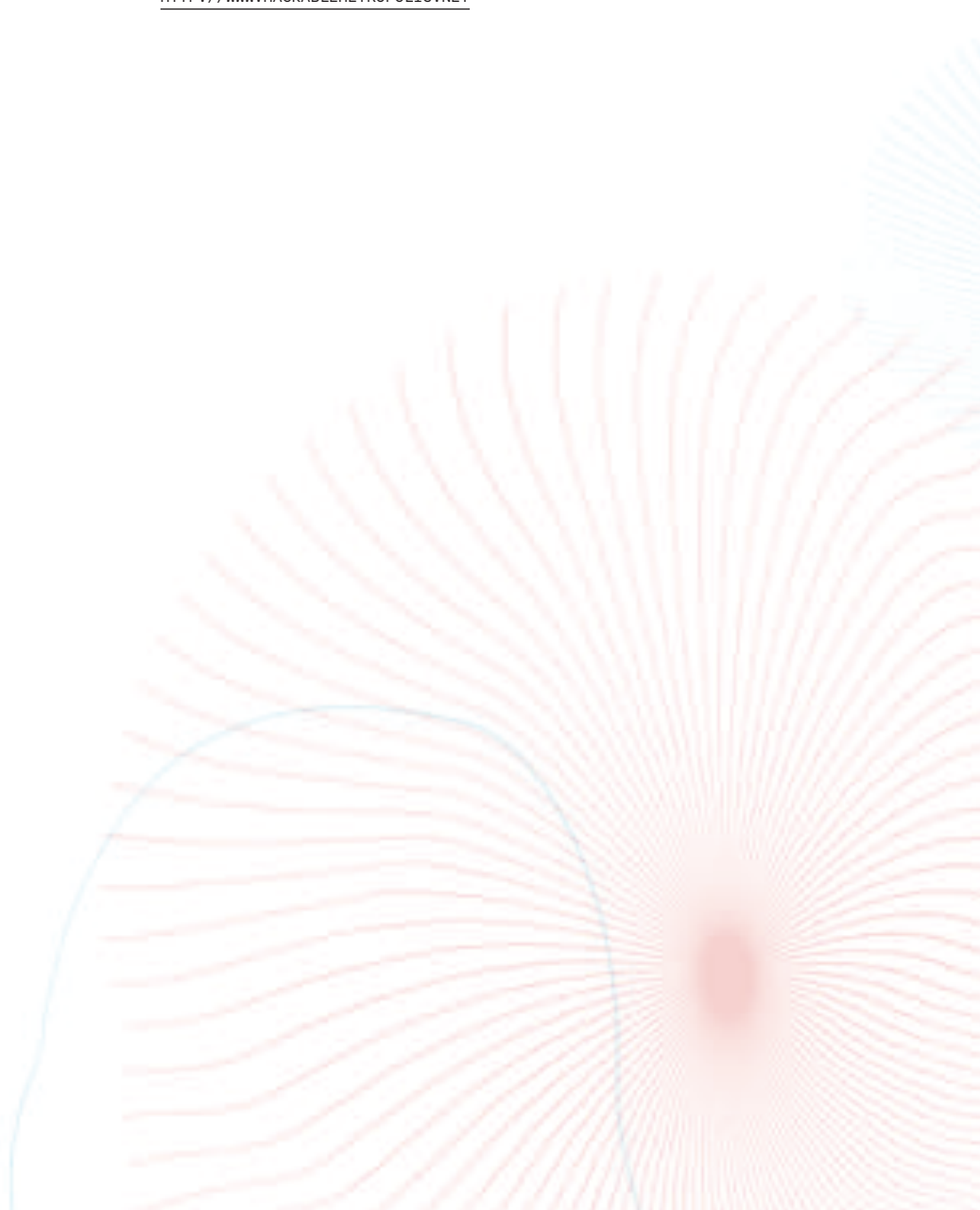
Projects

THE PROGRAMMABLE CITY research project,

[HTTP://WWW.NUIM.IE/PROGCITY](http://www.nuim.ie/progcity)

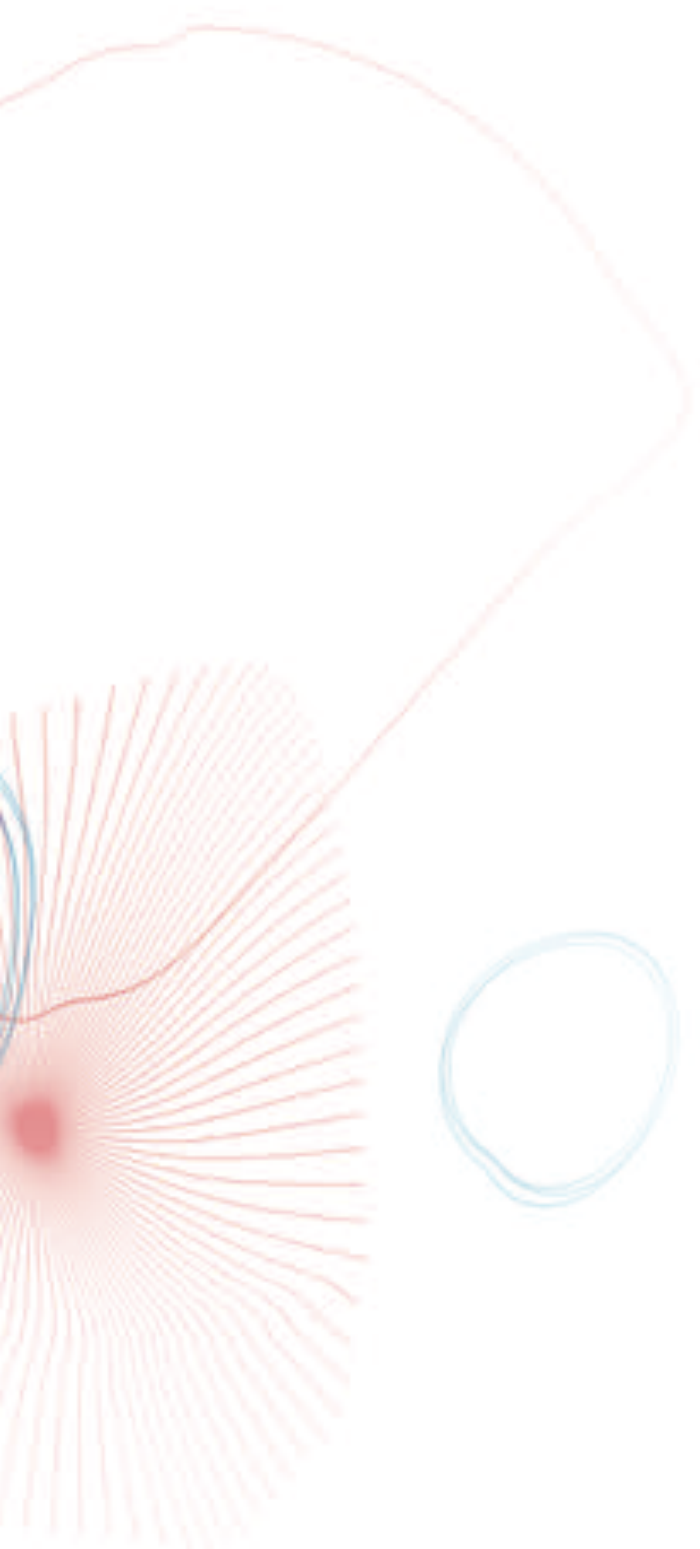
THE HACKABLE METROPOLIS research project

[HTTP://WWW.HACKABLEMETROPOLIS.NET](http://www.hackablemetropolis.net)



Foundations





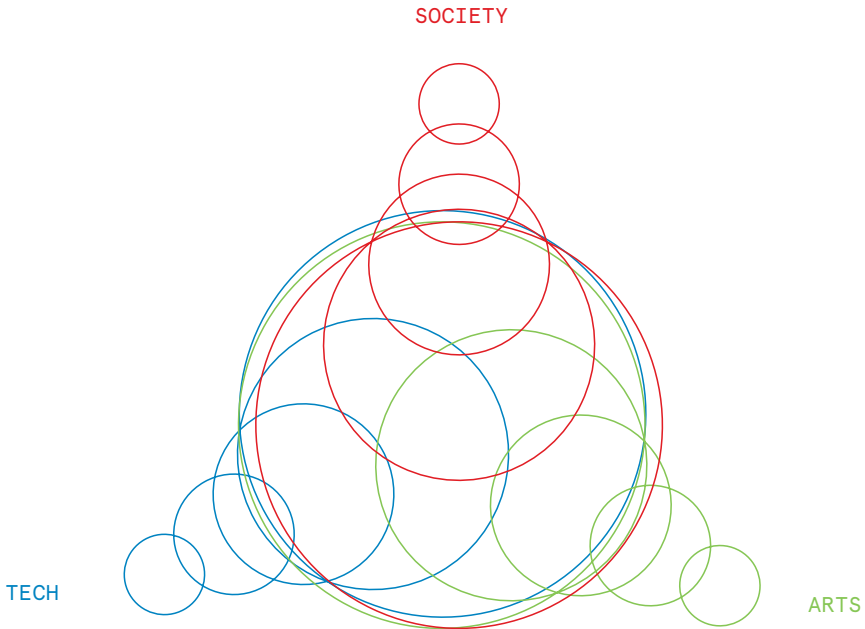
Becoming a Field from Many Traditions

This is our starting point: what is actually happening in the field of urban interaction design?

At the moment of writing, urban interaction design can best be described as 'a community coming together'. It is most of all an emerging field, rather than a settled discipline with a clear-cut agenda, a straightforward approach or established set of methodologies. Its boundaries are not quite clear, and many working within this field may not even recognise themselves as urban interaction designers. At the same time, over the past few years we have seen a broad range of authors, institutions, organisations, projects, networks of practitioners and events who have started to explore territories beyond the comfort zone of their own disciplines because they see it as a necessary trajectory. To tackle complex issues in the networked city from a human and societal perspective, they have found it imperative to start to work together with partners across disciplinary and institutional boundaries.

This section is an attempt to outline these dynamics and the transition towards hybridisation. Two particular patterns of movement are of interest here. The first is a disciplinary one. In order to tackle the complex urban problems of networked society, people working in one particular discipline have started to incorporate the methodologies and approaches of formerly separated domains or institutions who work in the domain of urban interaction design. These are:

- URBAN (COMING FROM A FOCUS ON SOCIETAL ISSUES) : THE CONFLUENCE OF THE SUM OF URBAN SOCIETY , INCLUDING ALL OF ITS COMPLEX LAYERS TOGETHER WITH THE AMATEUR AND EXPERT ACTORS AND STAKEHOLDERS WHO GIVE INSIGHT INTO THE SPATIAL CONTEXT OF HUMAN RELATIONS .
- INTERACTION (COMING FROM A TECHNOLOGY BACKGROUND) : INFORMATION COMMUNICATION TECHNOLOGY (ICT) AND INTERACTION DESIGN THAT REVOLVES AROUND THE DESIGN OF NETWORKED TECHNOLOGY OR COMBINATIONS OF DIGITAL AND ANALOGUE .
- DESIGN (COMING FROM AN INTERDISCIPLINARY ARTS TRADITION) : DISCIPLINES RELATING TO ARTS AND DESIGN , APPLIED OR THEORETICAL , THAT ARE PROFICIENT IN ANALYSING AND CONSTRUCTING EXPERIENCES AROUND OBJECTS OR PROCESSES .



For pragmatic purposes, and to indicate the general notion of clusters of traditions, we will refer to them as Society, Technology and Arts.

We have used these disciplinary fields to define the points on our compass that plot the key trajectories in urban interaction design. This community does not just bring various academic disciplines together but entails collaboration between various kinds of actors—academic and applied practitioners including professional designers, policy makers and engineers working in the fields of art, urban planning and ICT development. Equally important, are the various stakeholders involved in the issues that urban interaction design is addressing. These include local government, non-governmental organisations (NGO), various forms of self-organising collectives, and individuals. In urban interaction design they all have an active role in the consortia that are formed around relevant city making issues. Another category that is important to the field are the nexuses where this community becomes visible: the events, public programmes, protests, interventions, and exhibitions that, to some extent, provide a gathering space for community to share their ideas.

Approaches and Methods

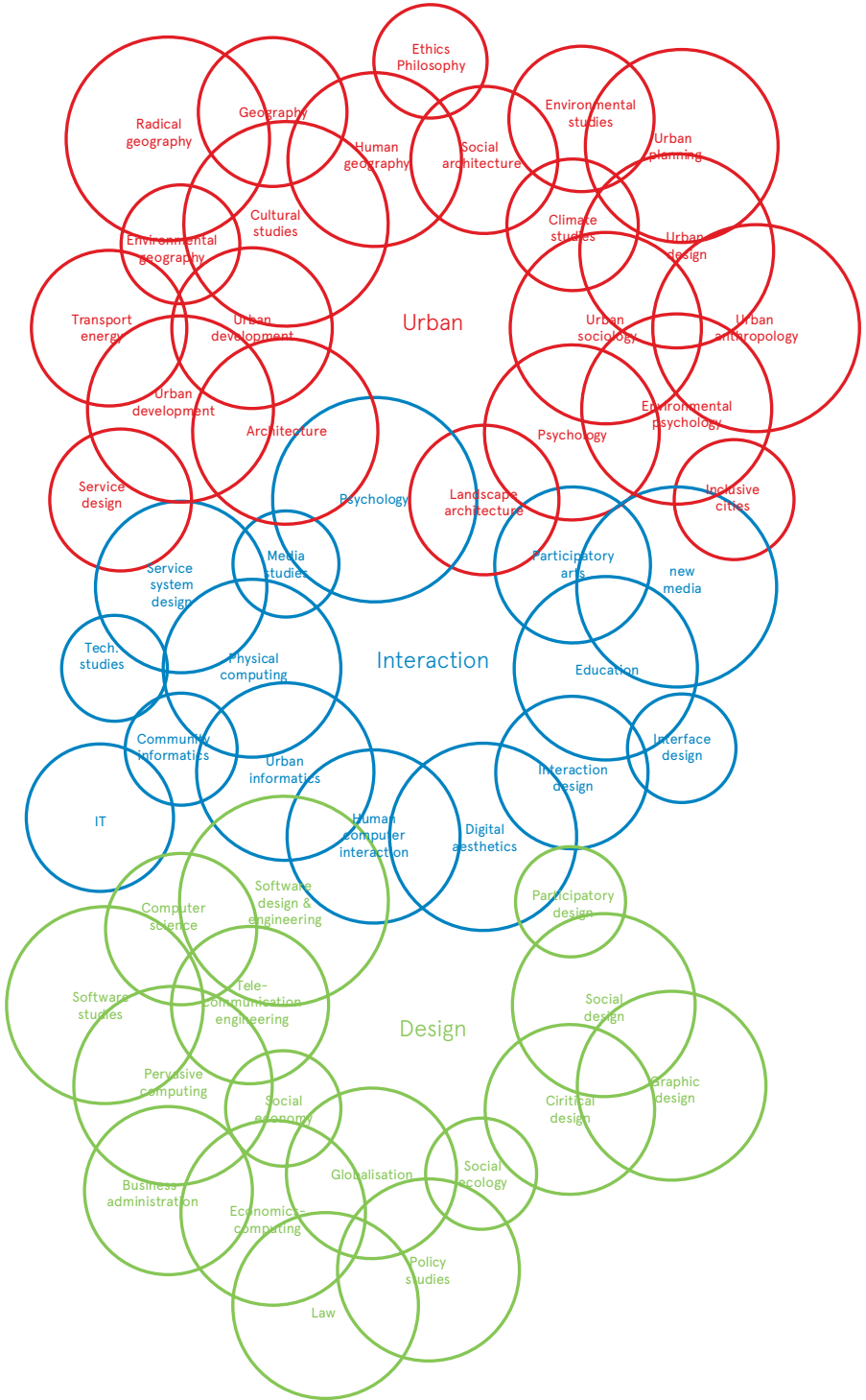
As stated in the preceding chapter, it appears evident that different actors—designers, city makers, artists, geographers, economists, architects, sociologists, anthropologists, among many others—are linked to, or moving toward, an increasingly overlapping set of approaches using all sorts of qualitative and quantitative research methods, in both analogue and digital forms, in virtual and physical applications. Social and technical layers are looming over the city, altering the interactions within it. Transforming the interactions among the city actors and agents requires a transdisciplinary approach and a suitable language that allows this work to be done. This process challenges existing conceptions of urban space and demands new and shared vocabularies to fill in the gaps that appear between systems and disciplines.

The feeling of inadequacy that stems from researcher/practitioner's inabilities to fully comprehend the complexity of the city, the existing conceptual disciplinary maps, and the limitations presented by the methods used within a singular disciplinary field, has impacted each discipline at different moments, prompting various reactions. For disciplines that adopt a macro approach to city making—such as urban planning, urban studies, geography and economics—the reaction came as a turn towards a more cohesive look at the socio-economic interplay between the traditional aims of spatial planning and the quality of urban life experience. These ideas are exemplified by Jane Jacobs and Jan Gehl in what they call 'the life between buildings'. Other trends in urban development also show the rearranging of interactions in the city. For example, bottom-up approaches towards improving urban space have paved the way for citizens to become active agents involved in the decision-making processes associated with the making and remaking of their cities.

With regards to technological disciplines, problems arise around the limitations and possibilities offered by each tool or system that determines the way interactions take place in urban space. Technologists are now repositioning their thinking about how they design tools that can actually change urban interactions. For human-computer interaction and related fields, such as computer-supported cooperative work, interaction design, and ubiquitous computing or the Internet of Things, the rapid expanse of urban issues has fostered a parallel uptake of concepts from different disciplines such as ethnography and design, and Winograd's shift from interfaces towards 'interspaces'. The importance of this development within these technical fields is that for a large part they try to put technology in the background, while foregrounding the many human-centred perspectives strongly influenced from the traditional design disciplines—not only because they provide practical tools to tackle urban issues, but also because they have generated sound critical thinking regarding established design practices.

In the realm of urban interaction design, all of its converging fields play an important role: they each bring crucial, new, disruptive and inspirational approaches to the table and toolbox, such as theoretical concepts, general approaches, methods and, most importantly, a rich professional practice. Context can be captured and developed in maps, and produce a vocabulary for dealing with stakeholders and issues around urban policies, plans, zoning, large-scale functionality and the socio-economic 'engine' that produces and is produced by cities. Spatial analysis can also be used to analyse social interactions. Field work can articulate a street level perspective that has become focused on participation, immersion and the creation of networks at a local level. The principles of knowledge exchange and co-production are central to this process. Audio/visual archiving, workshops, dialogue, and activism are all common techniques and strategies that are part of the toolbox for capacity building and self-empowerment.

From technology-related disciplines, skill sets such as coding, hacking, tinkering, and exploring hardware and software, invoke novel ways of understanding subject matter and process through new tools that enable rapid prototyping, alternative media communication platforms, and visualisations. Similarly, most of the branches of design play an important role in tackling urban issues because they have started to push designers, artists or practitioners into physical urban space as interpreters—facilitators that aim to alter the interactions within the city. In particular, critical design as an approach delivers analytical thinking as well as a broad range of artefacts, narratives, and interventions that fit into the toolbox of urban interaction design. This more critical and interpretive influence from design, literature, and media art brings alternative perspectives of the city into the vocabulary (e.g. reading the city as a text or a psychogeographic experience), and rather than focusing on the more traditional realm of services, products, bricks and mortar, and academic papers, emphasises other forms and outlets such as narratives, installations, and interventions as part of the urban interaction design directory. Emerging from artistic practices and industrial design, the final tradition comes from 'critical design', where criticism appears in the shape of absurd, provoking and alternative interpretations of society, urban life, commercialisation and the full socio-technical mix. Do It Yourself (DIY) culture also illustrates a close relationship to urban interaction design practice, embracing participatory urban development processes as well as more informal practices like flash mobs, protests, and other collective gatherings in public space. Tensions here emerge between the lines, in space where boundaries and experiences flourish and battle.



Methods

Adopting a transdisciplinary approach to work in and understand networked cities from a human-centred position involves choosing methods for characterising problems that fall outside traditional boundaries. Developing new understandings of complex situations is a fundamental task that should be guided by a holistic approach to city making. Some methods are appropriate to use at different scales. In what follows, we attempt to exemplify the crucial approaches influencing the field. The distinction between the archetypal methods/approaches presented and the actual toolbox or methodologies involved is not made explicit. We are more interested in illustrating how these approaches enrich each other, than making an exhaustive list of specific methodologies or techniques used in urban interaction design.

Mapping

Mapping is a method that helps to articulate the connection between the local and global by creating spatial relationships across different scales and visualising the impact that local measures have on a broader context. Citizen mapping tools have become a staple for augmenting or promoting civic agency and creating a faster feedback mechanism.

NYC BIKE SHARING SYSTEM

When New York City wanted to roll out a bike sharing system, the city's Department of Transportation created an interactive map where citizens could suggest the placement of individual bike stations. This exemplifies the positive possibilities of new tools that work with both open data and crowdsourcing. However, it also hints towards the idea that such mapping techniques only capture a subset of the issue or population in question, especially when using digital platforms which likely exclude input from a large group of people who, for example, might not have access to the internet or computer literacy skills to be able to give their opinion through such a map.

Prototyping

Prototyping or even better, prototyping in the wild, emerges as a highly efficient way to tackle challenges faced by urban interaction design. Prototypes do not only address a problem with a concrete solution, but also offer plenty of opportunities for the participation of different stakeholders. Deployed in the wild, prototypes can rapidly prove their use for the city and provide valuable

knowledge for accelerating decision making and informing the next iteration of the design process. Prototyping in the wild pushes practitioners into real-life situations, whatever these may be. Thus, urban prototyping is often highlighted as an increasingly important element for city making.

PROTOTYPING FOR ACTIVE CITIZENSHIP

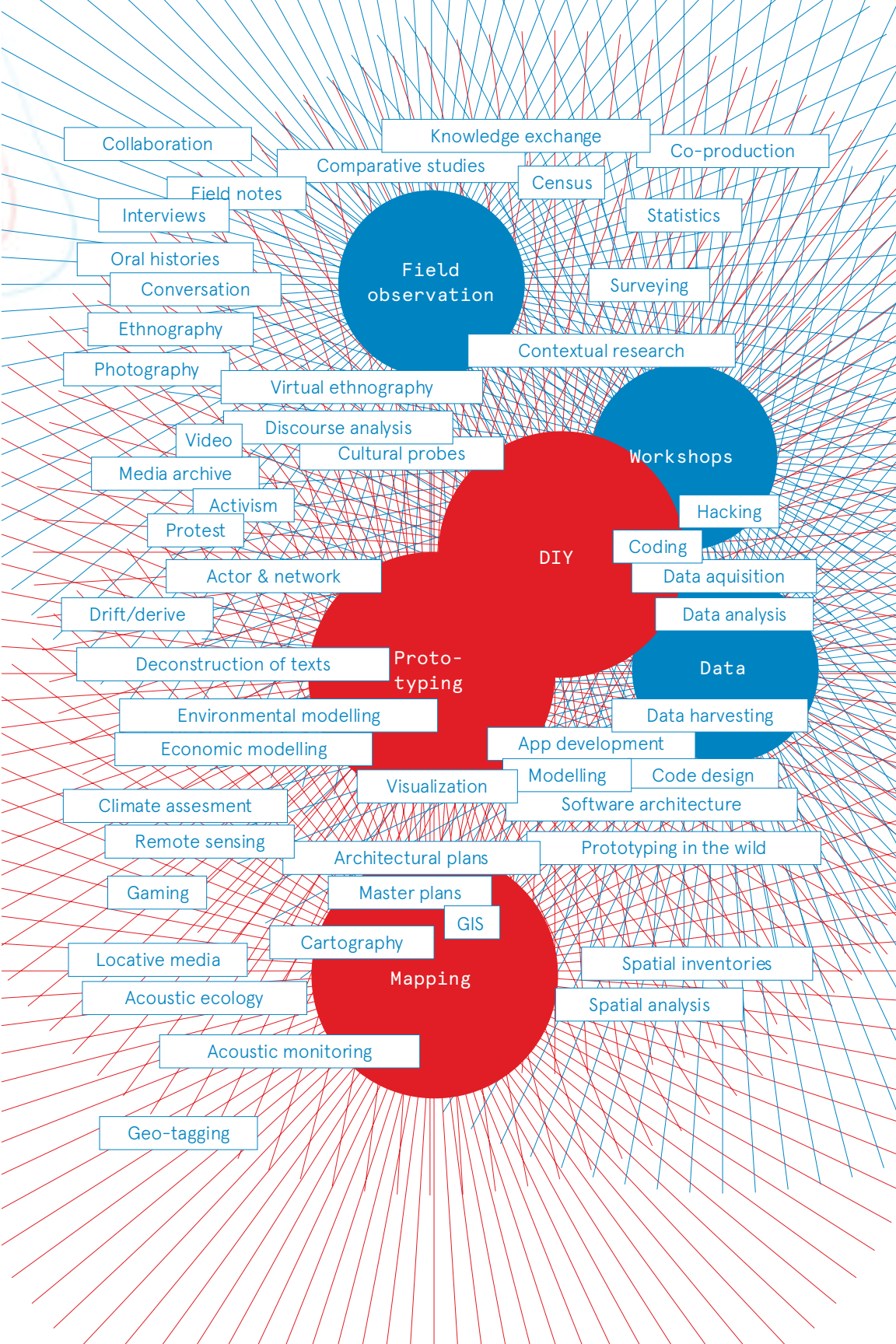
Students from the Exploring Interactions master's course at the Delft University of Technology were asked to study how city making could meet the social demands of citizens through urban prototyping. Projects included a neighbourhood showroom that provided citizens with a space to uncover and share their talents with others through organising exhibits in vacant property. The project gave new purpose to otherwise neglected public outdoor spaces. Both scaled and 1:1-sized models of each project were helpful in facilitating debate among citizens and local government during sessions in which the municipality discussed their changing role regarding active citizenship.

Do It Yourself

DIY challenges expert roles and sets a hands-on agenda centred on solutions to concrete problems. It is as much about doing as it is about learning and teaching with a practical agenda. DIY injects interaction into the urban interaction design process.

DIY SPECTROMETER

Creating diagnostic tools that help identify the extent of soil and water contamination using low-cost materials and open source tools, Public Lab created the DIY spectrometer to enable users to identify and evaluate contaminant levels in the quality of the water in their environment. An analogue device can be ordered online from the Public Lab website, or downloaded to your smartphone, depending on your needs. The Lab can also be used to identify crop disease, plant species, and assess airborne pollution.



Field observation

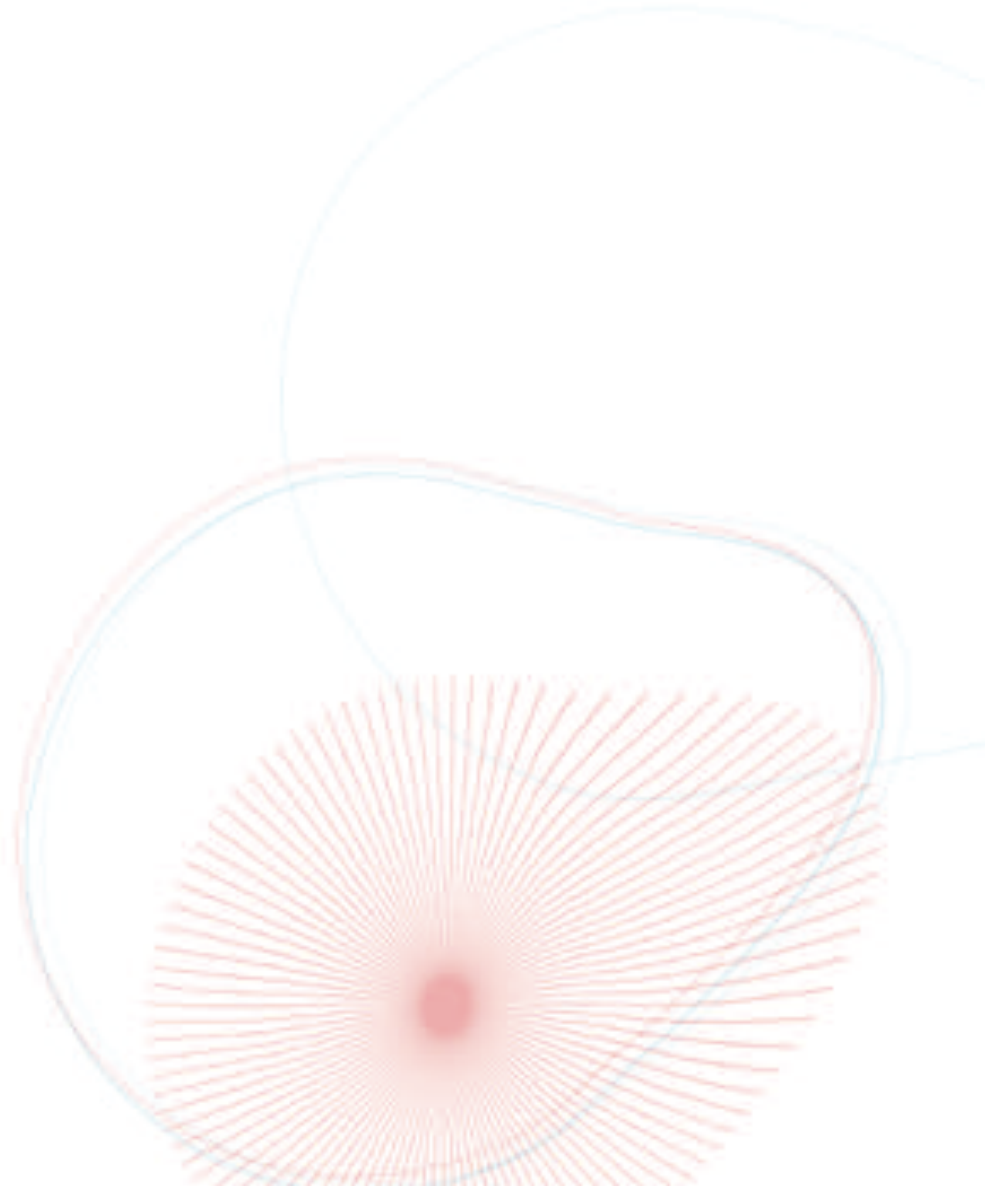
Workshops

DIY

Data

Mapping

This confluence of approaches and methods represents an attempt to understand new hybrid spaces and their many possibilities, but is also a response to the many disciplinary challenges or conceptual inadequacies of each field. Adopting a transdisciplinary perspective can help close some of the gaps in knowledge between fields, and can also help advance an interdisciplinary vocabulary. This leads to exciting new forms of knowledge exchange and language, both within and across disciplines. In turn, this has led to embracing a more reflective, collaborative approach to research and practice that embodies the transdisciplinary philosophy of urban interaction design.



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Projects

DIY Spectrometer:

[HTTP://PUBLICLAB.ORG/WIKI/SPECTROMETER](http://PUBLICLAB.ORG/WIKI/SPECTROMETER)

NYC Shared bicycle project:

[HTTP://UNTAPPEDCITIES.COM/2012/05/17/USING-OPEN-DATA-TO-PLAN-THE-NYC-BIKE-SHARE-SYSTEM](http://UNTAPPEDCITIES.COM/2012/05/17/USING-OPEN-DATA-TO-PLAN-THE-NYC-BIKE-SHARE-SYSTEM)

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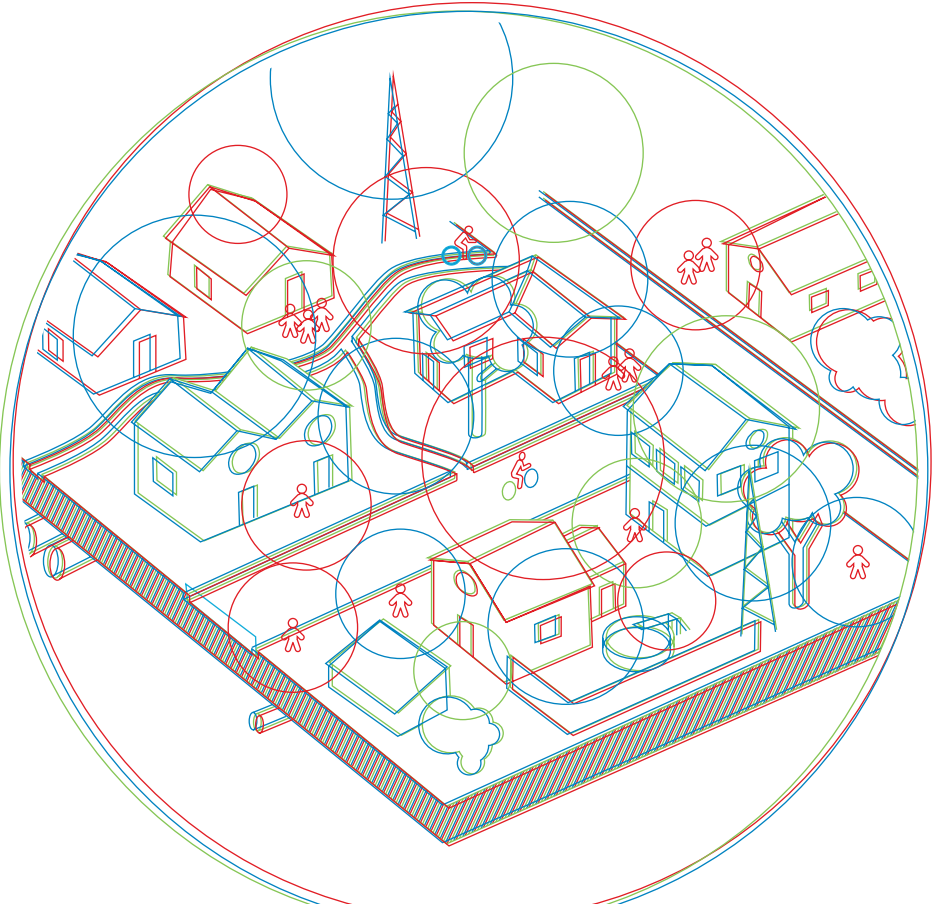
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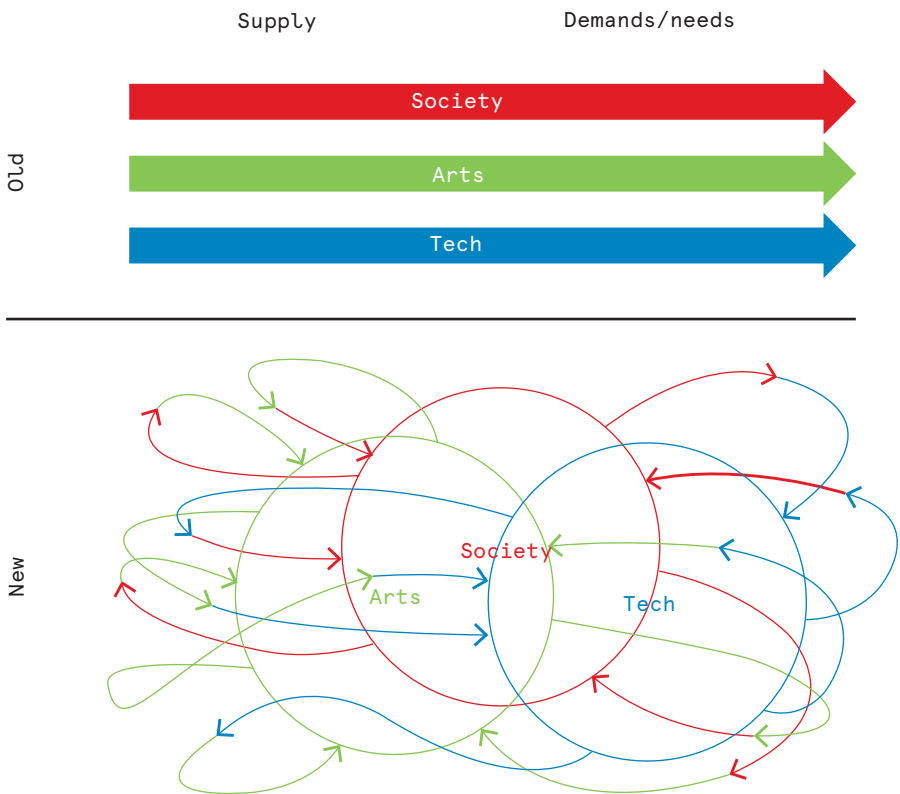
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The City as an Urban Interaction Design Platform

This chapter aims to introduce some concerns and issues around concepts that are arising as the field of urban interaction design emerges. It is no longer meaningful to have a complete separation between the idea of an urban plan, a building or product, a service, technology or interface, or see these in isolation. What it is we are developing constantly changes depending on use and context. What is understood and used as a product by one group is a part of the service infrastructure for another, or a tool for mapping the city for an entirely different purpose. For example, in its simplest functional form, Google maps is both a map that provides a service for the majority of its users; an application program interface (API); and a tool for a whole different group when organising political meetings, mapping urban issues, or coordinating a flash mob. The point being, is that one person's product becomes a platform or tool for others. This idea about the fluidity of products and the notion of platforms is not entirely new within each field.



This paradigm shift can be contextualised from the historic view of a well-defined set of markers and rational sectors of efficient operation and management that nicely align supply and demand to the finite boundaries of the city and to post-digital contemporary networked societies, that include megacities with sprawling slums and massive inequality, linked by a commodified globalism, through digital tools, media and materials. In this new situation, the demand (or needs) side of things intertwine, are messy and ill-defined, and infinite. The appropriate architectures of the multi-helix networks of suppliers responding to reciprocal networks of demands and needs are staggeringly unclear. As a consequence, we see *handelsverlegenheid*, as they say in Dutch: despair, embarrassment and stress stemming from not knowing how to act in a given situation.



The paradigm shift in supply-demand alignment: clear and separated alignment of supply and demand (top), moving towards complex and reciprocal organisational structures of networks of suppliers meeting demands and needs within the networked city (bottom).

The Design of Cities from an Urban Interaction Design Perspective

A city can be understood as a very complex system (or a set of systems) with plenty of actors and an immensity of interactions between them. In complex spatial planning, more actors representing different approaches (not only different stakeholders) are beginning to be included, or are injecting themselves into, discourse that eventually impacts on urban plans. Recent tendencies show that this is a direction urban planning is evolving towards—connecting different fields and establishing interactions between them as a principle. Urban planning is no longer a land of urban planners and (basic) stakeholders (even though it has never been an exclusively fixed field). City design respects more and more perspectives, approaches and uses, integrated with ever more advanced tools to reconcile these. The tools used for and in urban planning are now something that is drawn from other fields. Urban design also requires interactions between traditional and newly established actors as well as manoeuvring between different fields/disciplines. The traditional role of the urban designer, so far being Alpha and Omega in city shaping processes, has also shifted. Facing this new reality, the role of urban interaction design is now beginning to facilitate interactions and communication among several complex layers of actors.

Soft City—The Social Fabric of Communities

Having presented the idea of the city as a complex platform, it prompts the question: a platform for what? This question is closely linked to, not the direct product or outcome of the involved disciplines, but what we ultimately seek to support, shape and provide a foundation for with the many plans, products, services and applications created and used, namely, the life between the buildings or perhaps even life between systems. For the urban planner, the purpose of working with zoning, the interconnection between different urban spaces, and the functionalities and structures of space are to create a physical environment in which a rich and diverse community can grow and where everyday urban experience can unfold. For the architect, in particular, it is the very concrete framing of the life between buildings, and similarly, the service and interaction designer seek to support and provide meaningful services and applications that pertain to, enhance, support and explore everyday life. So, the subject matter of urban interaction design is the thriving urban social life, the community of strangers. Here, the technologies, services and tools we produce are seen as the means to that end—a rich and diverse urban experience in a community of strangers.

With the idea of the platform in mind, it is interesting to explore what this community of strangers is and which forms it takes. Though we can roughly distinguish between *publics* and *communities*, the terms remain

interchangeable. Publics form when something happens or becomes an issue that mobilises individuals, groups of people, media or organisations to take action and give voice/representation/face/body/corpus to a given issue. This can be momentous or happen briefly around controversies or along the boundaries of the many different ways of urban life. Communities typically originate from place, interest and/or shared activities. The idea of distributed or virtual online communities is both made possible by and an interesting development for networked technologies. *Communities of practice* are based on shared practice, shared goals, and shared activities (discipline, workplace, education), with the focal point being the shared practice, the knowledge, and the language and artefacts attached to this. This perspective has, in relation to urban interaction design, been developed through Computer-Supported Cooperative Work (CSCW) in their focus on distributed tools for online/virtual collaboration around work activities, for example, with groupware. Today's fablab ('fabrication lab') community can be seen as a community of place, a community of interest, as well as a community of practice; this illustrates the value of both the physical location, the fablab as a venue, as well as the global making-movement.

The lines are also blurring in how communities and publics are formed, shaped, and represented, and in the ways they meet and interact. The lines that demarcate community of place become increasingly hazy as people take part, for example, in communities of practice that are detached from a specific locale due to increased mobility, and are finding new ways of taking part in activities in a much more distributed manner due to the emergence of networks and technology platforms. For example, we can work on a shared document from anywhere or simply live and work in separate geographical locations. Similarly, communities of interest are not confined by place and are increasingly moving into virtual online communities. Or a community of interest could also be seen as a public, where the community mobilises and continuously seeks to make the issues of concern 'public', and publics could take the form of a community, when the initial mobilising issue makes their shared concerns visible.

In its broadest form, community is the central core concern of urban interaction design. The role of communities and how we engage with and across communities to understand, capture and address the potential in, and issues related to, them is crucial. Do we *just* see communities as a subject—something we develop or design *for*—or mutual partners that we co-design *with*? Perhaps we give the mandate, tools and right initiative to them, or perhaps they take it. Whatever the case, citizens are beginning to take more control of the design of their cities because of networked technology. Moreover, digital tools and new media are allowing communities to shape and support the formation of publics around specific issues, linking concern, voice, and access in a way that allows them to use the city as a vibrant platform from a bottom-up perspective. This, ultimately, is a large part of what urban interaction design aims to facilitate.

Towards Urban Interactions

In attempting to define interaction from a human-centred interaction perspective, as the way people use, understand, and experience products, services, and situations, it becomes clear that understanding the future of the networked city is not straightforward. Within the complex levels of interaction, the character of the user is changing. Users are diverse, multiple, made up of different groups, and/or targeted differently. Users are part of different, multiple communities simultaneously, with multiple stakeholders, investors, policy makers and actors involved. They might be more active in one phase of a process over another, and might have different and conflicting interests. Their collaboration becomes networked, and involves connecting with an array of heterogeneous networks. The focus is increasingly placed on an entire ecosystem of tools, services, systems, products, their environment, or their resulting outcomes. The impact on the personal, social and urban level implies that products and services are no longer only products and services, but may be subverted by the user to their own end, as we have seen in movements such as Occupy Wall Street or of course, its famous and more impactful predecessor, the Arab Spring. The increased complexity of the development of urban product service-systems goes hand-in-hand with complex heterogenous actor networks. The interplay between people and networked tools, the abilities, concerns and practices of people, and the properties and behaviour of products within this urban context is becoming increasingly complex. They are part of the urban ecology, the city as a series of platforms for urban interaction.

In regards to designing for these platforms, questions arise: How do different people experience and value the different interactions? How can we evaluate the effect of the different interactions iteratively? How do we evaluate how they affect the personal, social and urban context in which they appear, or are used? How can we empower people co-creating their own space, place, and community? How is urban interaction design a means to understanding, framing, intervening, or directing networked interactions in urban contexts? Is it a framework that guides communication and collaboration among parties? How do designers develop tools for different uses within these complex social fabrics? And finally bringing to bear the question: To what degree are physical networks (for example, people physically meeting each other rather than chatting online) impacted? This requires a closer look at participation—who makes the city?

Who Makes the City?

The networked society we are living in, boosted by the predominant presence of mobile technologies, is faced with a new set of tools, mindsets and expectations about living together. We are turning into societies that see the increasing and continuous spread and flow of ideas and information. Emotions and desires

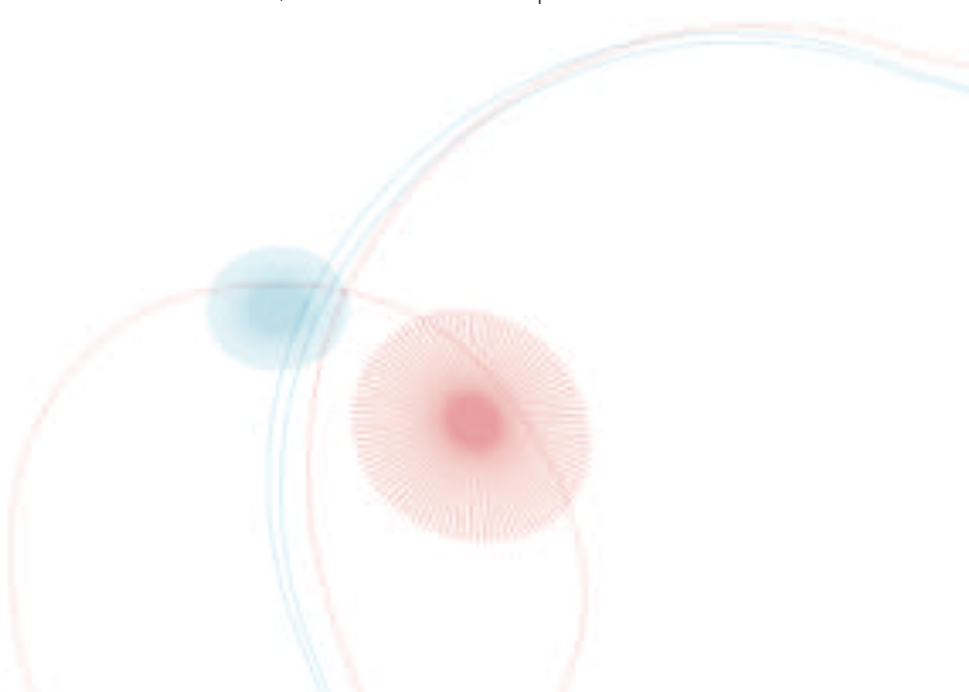
can be shared and made public instantly. We are (potentially) better-informed citizens and communities, or at least we have gained an unpredictable access to a more diverse source of information with which to build our opinions and express our needs. This, however, doesn't necessarily turn into more power or agency. That depends on accessibility to these networked tools, levels of democracy, institutional frameworks, governance, or the personal skills to utilise this potential. The role of citizens in public life is expanding and the demands for new forms of participation in public issues are on the rise. What do we expect as citizens and communities to be able to be active shapers of our own life in cities?

The sum of interactive technologies that are reshaping our societies is also transforming our aspirations and the possibilities for a broader and more active role in the way citizens and institutions interact with publics, governance, community problems, and the products we use, etc. Urban interaction design appears as a new framework to deal with this growing claim for involvement in the decisions that affect us at any level. As such, it contributes to a well-established domain (the strong tradition of and experiences from participatory planning and design in any of its forms) of how to design mechanisms and processes that promote and give citizens access to being protagonists of the public policies and decision-making procedures that affect our everyday lives. In this sense, urban interaction design stands in an appropriate place to enrich the traditional tools, practices and mechanisms that have been designed in the last decades to deal with this concern. For example, this includes both classic forms of institutional participation (community meetings, referendums, public surveys, visioning sessions and all sorts of other techniques, tools and methods) and the traditions of direct action (demonstrations, occupy movements, labour movements, etc.). Globalisation has indeed changed the effectiveness of these traditional forms of building voice.

Emerging technologies are giving us new tools through which to mobilise, disrupt power agendas, share public opinions, reach local representatives, build and organise communities around particular problems, access public information, put forward solutions, and so on. Some of them are completely new forms of participation almost unthinkable decades ago, while others are just broadening the potential, scope and robustness of already existing tools. This is not only the case for public life and public policy decision-making. Designing products, infrastructures, and services has benefited, again, from the new practices and concepts of co-creation, co-production, and prosumers (producer consumers). Urban interaction design strives to put users in the centre of this design process. Whether thinking of citizen participation or user participation, we seek to rebalance the decision-making process so protagonists can better inform the process, gain empowerment or claim ownership, and thus make space for less powerful actors to take part in top-down decision making, and possibly even reduce or remove differences in power.

It's not only that the amount and variety of participatory tools has been expanded thanks to new developments in technology, it's also that these technologies are comprised of attitudes in the way they may be used. This is where ideas such as openness, adaptation and personalisation, real-time response, transparency, and DIY are flourishing. This again, defines a context in which urban interaction design can be relevant: underlying societal change driven by a changing technology landscape, and why the field can make a major contribution to enhance the way societies are able to give form to this growing demand for public participation. To put it in different words: today and in the coming future, urban interaction design has the opportunity to impact the aspirations of civic engagement and make it a more profound, direct, effective and diverse experience of engaging in public issues.

This context is a partial explanation of a diverse pool of processes, projects, interventions and actions that set the ideals of civic participation as a central goal. However, designing for participation is not easy, and in particular, in the context of urban interaction design, it can be quite complex and ambiguous. Participation is not an exact science and designing participatory processes in any field is always strategised on a case-by-case basis, relevant and relative to particular contexts, goals, and practicalities. In this sense, the process of change we are witnessing adds more opportunities to design successful participatory strategies in many fields. Urban interaction design can bring much to the table, enhancing and providing tools for a diverse range of actors to join in civic engagement that takes many different forms, scopes, strategies, moments, and processes. In this sense, what we have traditionally called participation is broadening with a new generation of available approaches, a more creative use of civic engagement strategies, more powerful tools for better-informed involvement, and action-oriented representativeness.



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Projects/Exhibitions/Research Groups/Organisations

100 URBAN TRENDS-BMW GUGGENHEIM LAB

[HTTP://WWW.BMWGUGGENHEIMLAB.ORG/100URBANTRENDS](http://www.bmwguggenheimlab.org/100urbantrends)

CONNECTING CITIES

[HTTP://WWW.CONNECTINGCITIES.NET](http://www.connectingcities.net)

ENABLING CITY

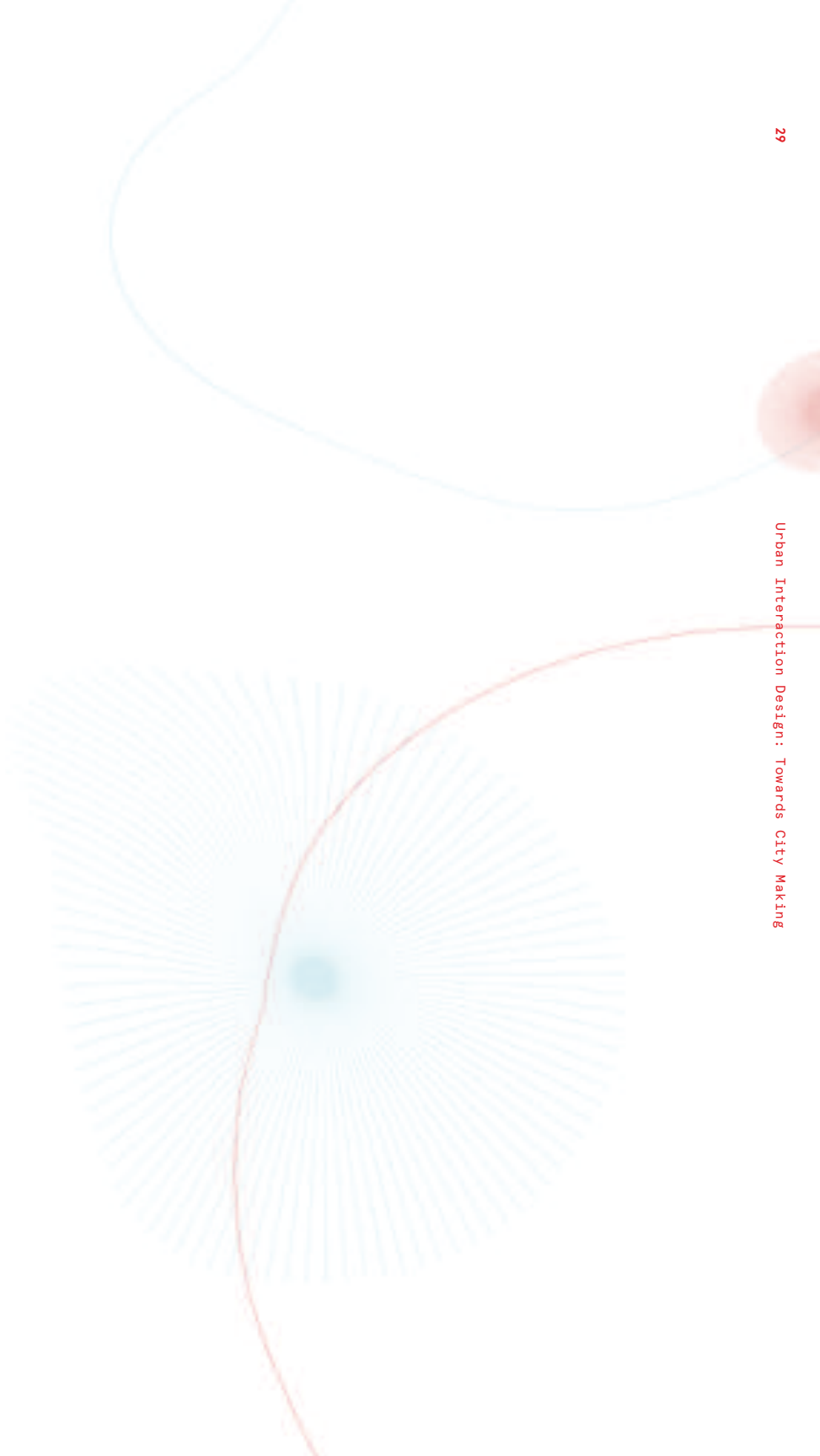
[HTTP://ENABLINGCITY.COM](http://enablingcity.com)

MEDIACITIES

[HTTP://MEDIACITIES.NET](http://mediacities.net)

POST-IT CITY. OCCASIONAL CITIES

[HTTP://WWW.CIUTATSOCASIONALS.NET](http://www.ciutatsocasionals.net)

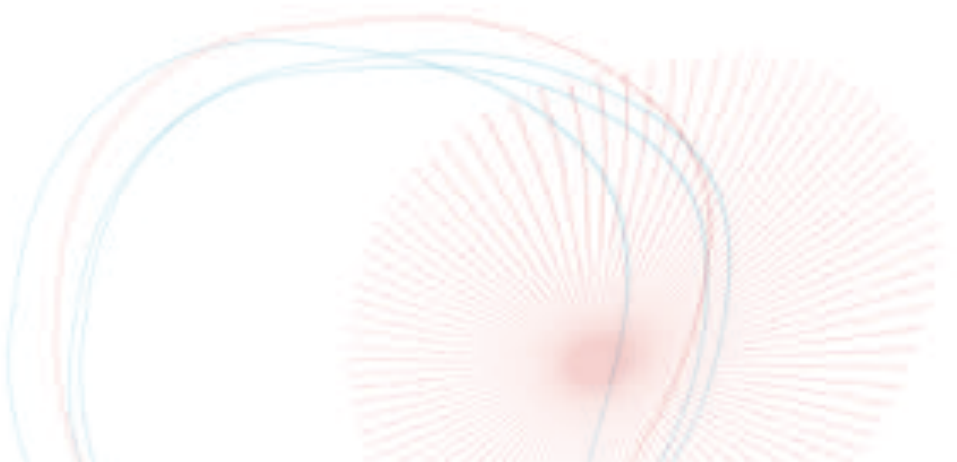


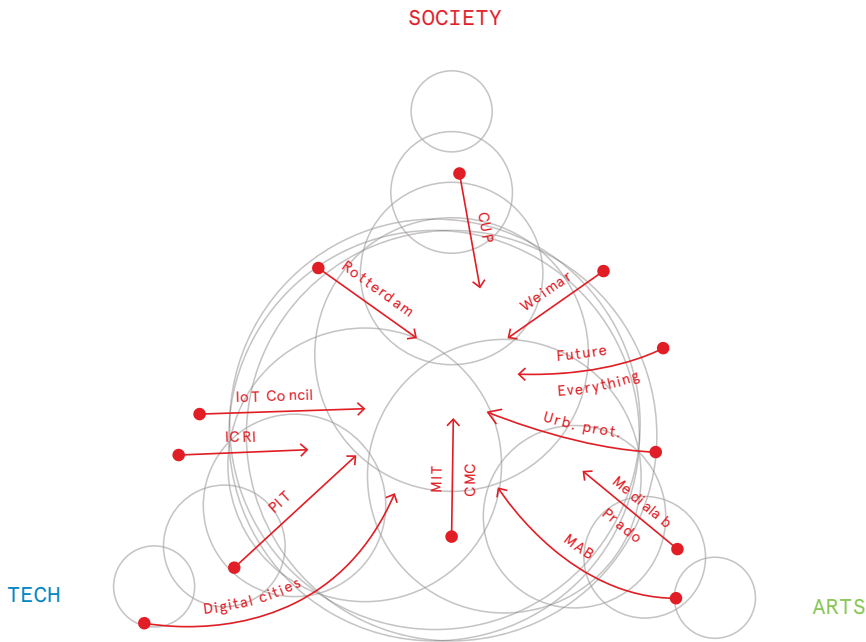
Illustrating the Confluence

To point more specifically to where the field of urban interaction design is forming, the following groups exemplify the movements from one or more of the established traditions we wanted to explore, such as contextual/urban, aesthetics/applied art and design, and interactive technologies. While the cases selected illustrate a trend, the following list is far from being exhaustive or even a selection of the best examples. It is rather a rough collection of some actors that come close to the urban interaction design field and are also a source of inspiration for the academics and practitioners that work in this realm. The following categories point out a proximity to an area rather than an absolute classification of the work done in such groups.

The groups listed below are symptomatic of an emerging field. The fact is that the people involved in them do a better job at getting in touch and working together with others that come from a different tradition. This cross-disciplinary approach also signals the gap that exists between disciplines, which should be approached in a more structured and formal way. The projects, ideas and writings that come out of the groups, also show a path for this emerging field.

Some of these groups meet regularly, others at an event, while some meet in the academy, and others outside of it. However, this is not truly relevant. What is relevant is that they are all working on similar issues; using similar methods, tools and strategies; share similar concerns regarding the city, its citizens, and the way they interact; and the means they use to achieve their objectives.





Participatory IT Centre, Aarhus University DENMARK

Building on the Scandinavian tradition of the participatory design of workplace IT systems, this interdisciplinary research centre combines methods from interaction design and human-computer interaction with digital aesthetics and software studies. In this sense *City Bug Report*, one of the projects they've produced in the last years, exemplifies the kind of hybridisations that can make a difference in city life.

The project is an urban intervention which allows citizens to both report any concern they have about the city, from a hole in a street to complaints about a school, and view the dialogue that takes place between the citizen/community and the municipal government over these issues via a local open data platform. This allows for a kind of track-and-trace of concerns and for visualisation in public space. *City Bug Report* includes several urban interfaces: media façade on city hall tower, mobile service, and desktop web. The aim was to foster transparency for the ongoing dialogue occurring about improving the quality of the city.

PIT.AU.DK

Media Architecture Biennale

The field of media architecture is in many ways emerging in parallel to urban interaction design, but from a different tradition: media art (non-commercial) and urban media (commercial and municipal). Moving from urban screens and media façades to a more holistic and contextual view of the interplay between technology and the built environment, the Media Architecture Biennale (MAB) has moved from the first events in 2007 (London) and 2008 (Berlin) to the Media Architecture Biennale (Vienna, 2010), which was later complemented by a proper academic conference in 2012 (Aarhus, Denmark). MAB has become a rare meeting point where practitioners (architects/designers/artists), academics and industry come together.

The theme of MAB 2014 is 'World Cities', signalling an increased sensibility and orientation towards contextual and societal issues. The previous edition's catalogue showcases 60 exemplary cases of media architecture from around the world, divided into five categories: Animated Architecture, Business and Money Architecture, Participatory Architecture, Spatial Media Art, Future Trends and Prototypes. The Media Architecture Awards were given to a project in each category (two in Trends and Prototypes), e.g. the project *Blinkenlights* won the Participatory Architecture Award.

MAB14.ORG

Digital Cities Workshops

This workshop series started as a venue for ICT researchers. It was the early days of the web and hypertext, and researchers were coming together around the ways that software and sensors could be applied to city management, what in today's terms could probably best be described as the Internet of Things (IoT) or urban informatics. Later, participants of the workshops shifted much more towards HCI and community practices around the systems. This is reflected in the fact that the Digital Cities workshops went from being an adjunct event to being a conference of the Institute of Electrical and Electronics Engineers (IEEE), to being part of the Association for Computing Machinery (ACM) Communities and Technology conference series, with the papers being published as part of comprehensive anthologies.

The research anthologies *Handbook of Research on Urban Informatics* (Foth 2000) and *From Social Butterfly to Engaged Citizen* (Foth et al. 2011) were founded on the contributions to Digital Cities 6 (2009) and 7 (2011). Digital Cities 8 (2013) is expected to lead to a similar publication. These volumes contain a large range of groups, fields, methods and cases relating to the emerging field of urban interaction design. Aaron Swartz, who later committed

suicide after being arrested by MIT and while being charged for the illegal systematical download of copyrighted academic journal articles from the JSTOR database, presented some of his early work on semantic web at Digital Cities 2 (2001) taking ideas that later went into his involvement in the development of important projects like RSS, Creative Commons and Reddit into the urban domain. Thus, Digital Cities has, from its inception, been a venue for technology-grounded debates about ownership, citizenship and activism.

MediaLab Prado SPAIN

Medialab Prado is a publicly funded cultural programme that represents the kind of shift cultural institutions may take if they want to get closer to what urban interaction design intends to do. It can be seen, beyond its organisational structure, as an active community of practitioners and engaged citizens involved in both discussing and delivering practical projects in a perfect match of citizen lab, cultural production and political research. Its fundamentals are based on collaborative work and multi-layered participation (different disciplines, different levels of engagement), and understanding that the intersection of open technologies in their diverse forms and creative and artistic approaches to problem solving can make a difference in today's cities.

It offers certain permanent initiatives on topics such as data visualisation ('Visualizar'), creative use of technology ('Interactivos'), urban screens ('Digital Façade'), or implications of the commons (Commons Lab), and it also gives space for more ad hoc activities (seminars and workshops, participation in international networks, etc.). Together, all of these activities illustrate how the work from the art/culture and technology communities can gain a contextualised impact by building local communities who are engaged in their own local issues.

MEDIALAB-PRADO.ES

Urban Sociology, Bauhaus-Universität Weimar GERMANY

Another example of this movement is the Department of Urban Sociology at the Bauhaus University in Weimar. Based at one of the pioneers of the modernist movement, the Department of Urban Sociology continues to recognise the phenomena triggered by techniques in urban space. The Department of Urban Sociology at the Bauhaus University understands that the complexities of urban research work can only be grasped through interdisciplinary teams. The department deals especially with problems that are seen as the greatest challenges to contemporary urban development. For example, this would

include communication, democratic participation, social exclusion and diversity. The department has engaged in research that addresses the overlap of urban space and technology. With a strong background in social analysis, the publications of the department show the recognition of technology as a key element in contemporary urban development. For example, *Media and Urban Space* deals with the influence that information and communication technologies have on urban life. The book *MEDIACITY: Situations, Practices and Encounters* investigates how the use and presence of new media influences the social settings and spaces of the city. Finally, *The Electronic City* refers to the consequences of new information and communication technologies on urban life.

IoT Council

The IoT Council is an (informal) network of professionals working in the field of the Internet of Things. As such, it is an example of a very specific discipline (in our case, in the interaction and technology corner of the triangle of disciplines) that has internalised the need to go beyond the technical challenges and incorporated social themes into their discussions. In this sense, it is again a new example of how embracing concepts from other disciplines (not expected to be part of a narrow version of their themes) broadens the limits of their own field of action and, at the same time, contributes to the shape of a new emerging field (in our case, urban interaction design).

This is not necessarily the case for anyone actively working on the Internet of Things, who are in fact expected to deal with the more technical aspects of the field. The community of the IoT council on the other hand serves as a good example to illustrate how even the most technically-driven clusters can incorporate a broader look at the impact and contribution they can make. In this way, research and action are fed with a sensitivity to topics out of their disciplinary boundaries, such as governance, inclusive design or privacy.

THEINTERNETOFTHINGS.EU

Future Everything

UNITED KINGDOM

FutureEverything is a well-recognised research and development organisation active in the digital culture field. Its almost 20 years of experience demonstrates exactly the kind of involved trajectories we are exploring here, and how hybridisation from the main disciplines involved in urban interaction design can evolve. FutureEverything's starting base was, to a large extent, rooted closer to what we are considering the corner of arts/design on the map or, in this particular case, the broad range of debates around contemporary culture.

Throughout their work, and with the organisation of ad hoc events and the different editions of the FutureEverything festival, they have progressively oriented their priorities and practices around the critical debates at the crossroads of interactive technologies and their impact on urban life. The programme of the 2013 edition of the festival is a good reference to understand the research agenda urban interaction design is working with, and one of the outcomes of the festival, the Smart Citizens book, is an important contribution. It is no surprise that they are also very active in the open data field (e.g. the project Greater Manchester Data Synchronisation Programme), understanding that this is a core feature of any cultural practice that wants to meaningfully address social issues in the urban context.

FUTUREEVERYTHING.ORG

MIT Center for Civic Media USA

A joint effort between MIT Media Lab and the MIT Comparative Media Studies Program, this group combines an alternative technology tradition with contextually-oriented media studies in providing quite concrete systems that support and foster civic media and political action. With a focus on empowering communities locally (in Boston, USA) and around the world, the emphasis is not on cities per se, but the centre has created a set of civic toolkits that serve to illustrate some of the possibilities and concerns surrounding technology-laced urban environments.

For example, *Data Therapy* is part of Civic Media Center's larger effort to build a suite of tools for community organisers. This particular project is helping small community organisations make presentations and visualisations of data by themselves, instead of relying on help from outside experts. The concrete activities consist of workshops and other forms of community engagement and education, in recognition of the importance of being able to inspect and critique data in order to express yourself, have a relevant voice, and take part in city making processes.

CIVIC.MIT.EDU

Rotterdam Open Data Community THE NETHERLANDS

Rotterdam Open Data is a movement and community where a 'Penta Helix' consortium joins forces in promoting the value of opening up data for reuse. Many good examples like this one could be mentioned as a way to express how the skills and methods from the open data field can directly impact local context or, in another way, how engaged locally-based groups can set up

solutions and tools to boost self-organisation thanks to digital technologies. The Rotterdam Open Data Community represents a good mix of disciplines that are contributing to generating social change and practical solutions on a hyper-local basis through building communities of practitioners to provide cities with solutions and tools.

This is the case for the creation process of the ScoreZe app. 'ScoreZe' (meaning, rate them) is a location-based application for measuring the quality of life with the purpose of informing the city about potential maintenance issues. This application provides citizens with the opportunity to log problems in public space, enabling the local municipality to re-use citizen-generated data to inform the maintenance budget. This example illustrates their strategic role in putting open data on the policy agenda of the local municipality, which in turn decided to allow the release of the city development service's public sector information as open data, thus promoting its re-use to build new apps and services (with citizens playing a role by providing the input for the creation of prototype applications). The Rotterdam Open Data initiative demonstrates that co-creation can also lead to the development of better public services, with citizens and the private sector contributing data by means of crowdsourcing. Such projects also pave the way for more co-creation through open service development.

ROTTERDAMOPENDATA.HR.NL

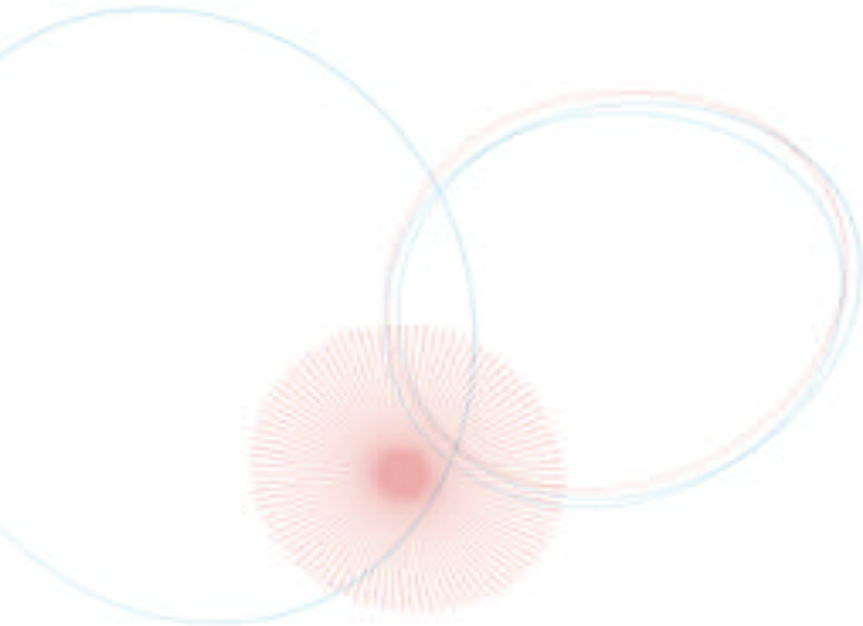
UP-Urban Prototyping USA

Urban Prototyping (UP) represents another movement we are witnessing in the mix of fields that constitutes urban interaction design. In this case, UP illustrates how a starting point closer to design and art activities can embrace a growing concern over local context and tackle the question of how to contribute to the needs of citizens in everyday life? Here, adding new perspectives in which interactive technology is mixed with strong DIY and prototyping design components can lead to novel kinds of urban interventions. This is particularly the case for some of their festivals and events which intend to be catalysts for identifying specific problems that could be addressed by technology and non-technology devices, installations, and tools developed with a mix of DIY approaches in order to hack physical spaces and transform urban experience. In this sense, Urban Prototyping represents a way to work at the intersection of creative interventions, taking a hacking approach to deal with technologies and public spaces.

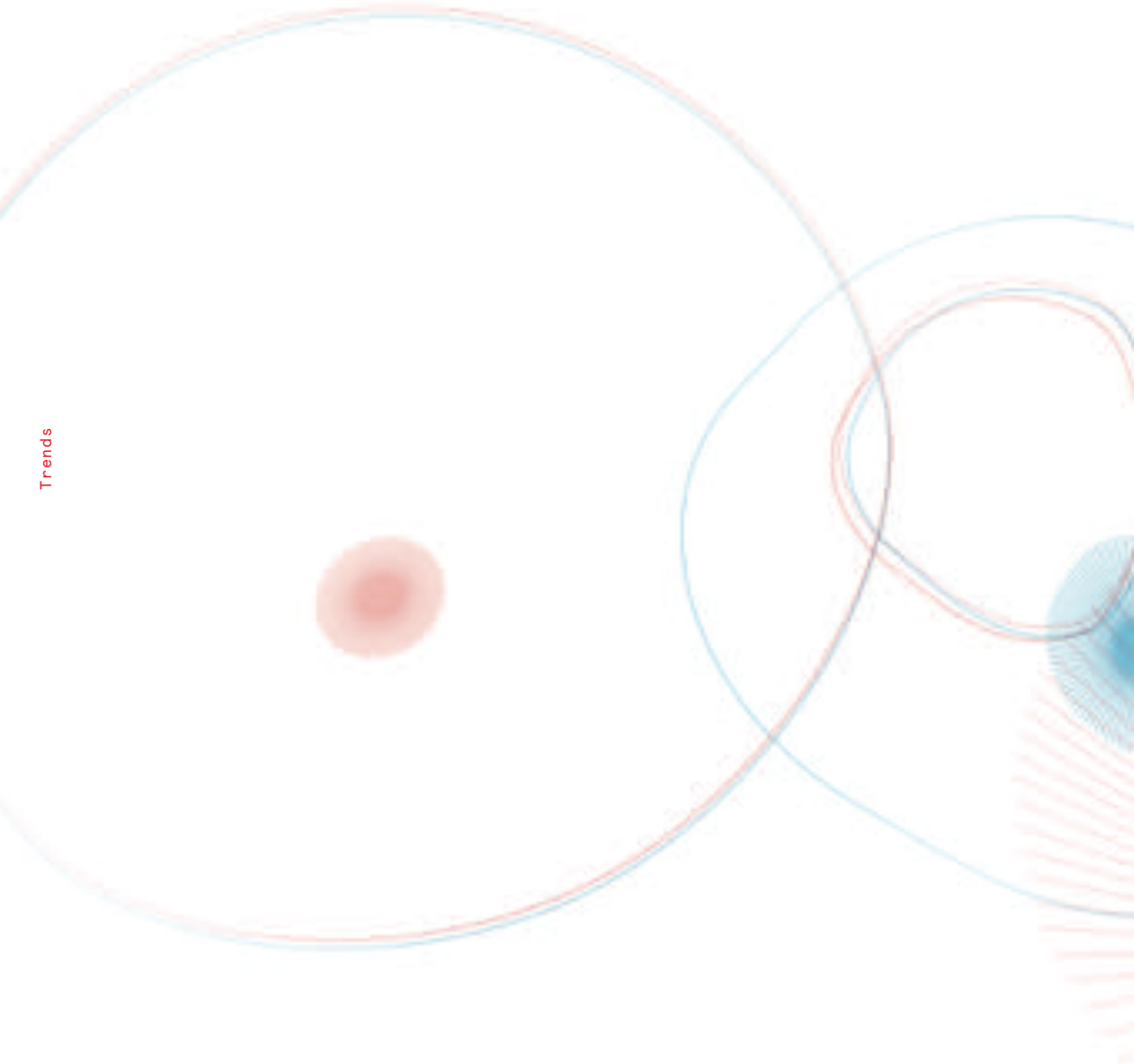
Their work, initiated in San Francisco, has spread to other cities and inspired further explorations in its hometown, such as taking advantage of the UP festival from 2012—organised as a makeathon event to beta test prototypes deployed

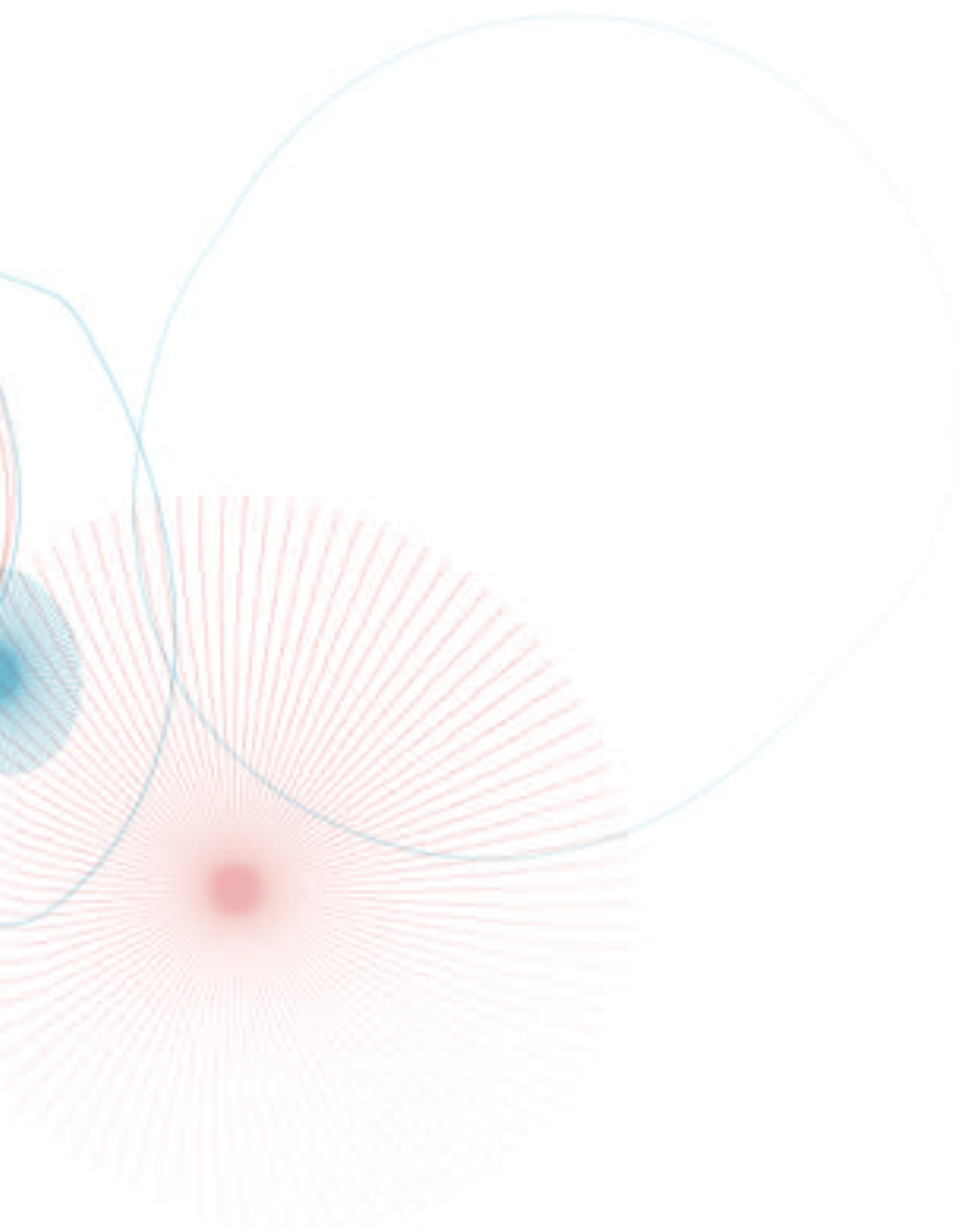
in different parts of the city—to currently establish a Living Innovation Zones programme. The programme seeks to deal with making institutional frameworks and regulations more flexible and allowing creative experimentation in the streets, thus creating the context conditions with which to gather the attention of and expertise from the design and technology world to create innovative solutions to enhance public life in the city.

URBANPROTOTYPING.ORG



Trends





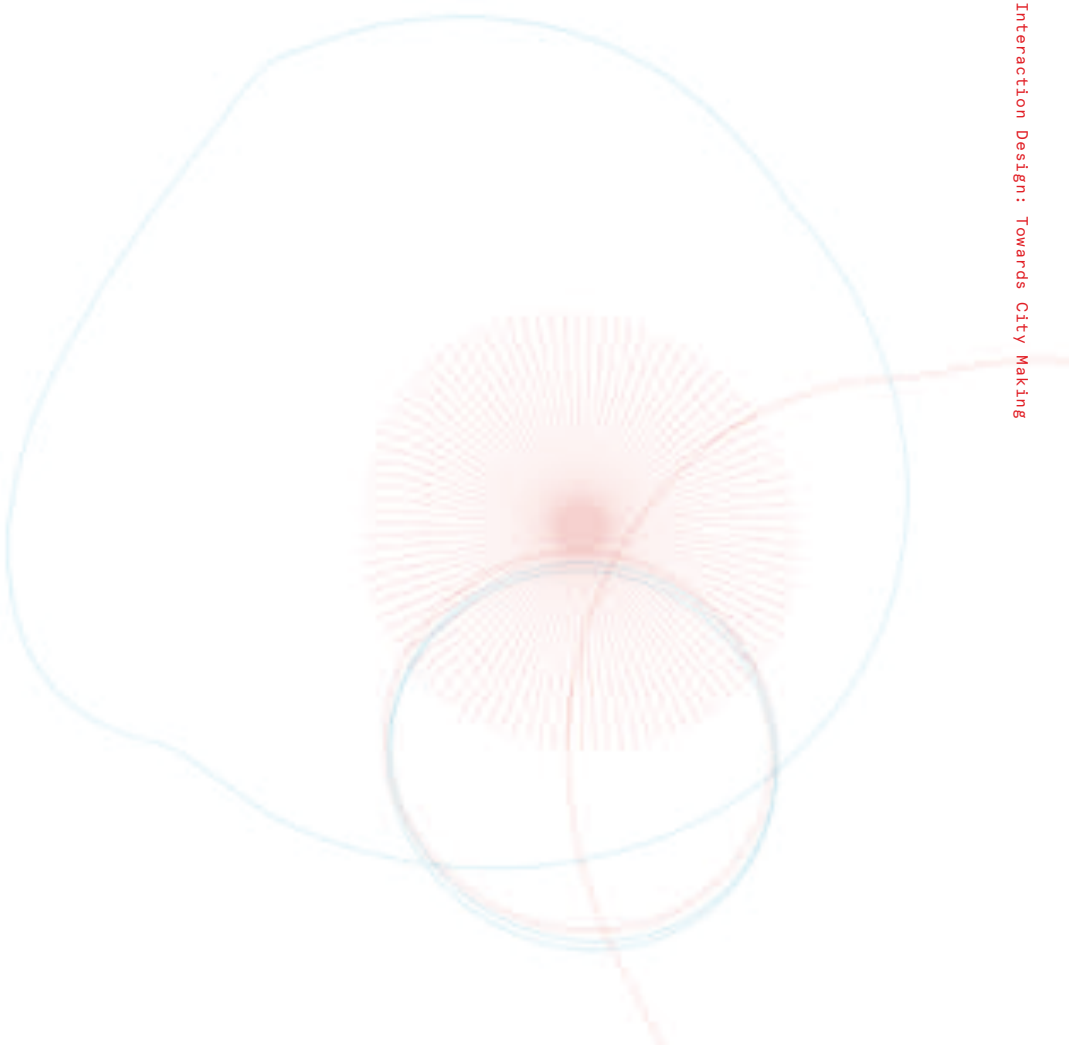
Up until now we have illustrated urban interaction design as a confluence of different agents, fields and approaches and have presented core issues and concerns as a necessary foundational step towards a baseline which we will now explore in more detail. What follows is a discussion of five dominant trends within the field of urban interaction design. These trends link to overall trends in the networked city. They are presented as a jumping off point, from which urban interaction designers may use to develop alternative readings, tangents, and perspectives. It is important to stress that the intention here is not to look at trends within the networked city as such. Rather, our focus is on the emerging field of urban interaction design as both practice and research-situated – a field which operates within the larger context of digital urban life. Thus, this chapter looks both at issues relating to reorientations within this emerging field, and how these reorientations matter for society.

The selection of trends presented here is neither complete nor analysed in meticulous detail. On the contrary, it is a set of argued positions that illuminate some of the core challenges that contemporary designers of urban interactions are facing, what some of the related tensions are, and what relevant responses to these trends we are seeing. These topics are organised to form a series of connected arguments. In the first section, 'Amateur Professionals Reshaping Cities', we discuss some of the consequences of one of the fundamental shifts happening with the use of technology: the blurring of the distinction between amateurs and professionals. This blending is also creating a tension between traditional and new roles within the field.

In 'Rethinking City-Making Institutions' we explore similar shifts within established institutions that have a traditional role in shaping cities. Following discussions on trends that centre around humans and collectives in the city, we explore 'Urban Product and Platform Reciprocity' which investigates how city life is being instrumented, and the tensions arising on different levels in the new urban stack.

'Sharing Tools for Sharing' establishes the argument that certain methods, approaches and tools are becoming central across the fields relating to urban interaction design. To illustrate this, we take a look at networked mapping which allows actors, including urban interaction designers, to operate on, and make incisions into, the layers of the networked city in new ways.

Finally, an overarching core concern that arises directly from new sharing practices leads us to discuss 'Designing for Digital Ownership in Cities'. Here we address the concept of ownership in relation to the production, aggregation and operationalisation of data.



Amateur Professionals Reshaping Cities

Don't Tell Me I Can't Do It

Within the current transformation in media, one of the most remarkable features is the emergence of amateur content creation and the disruption it causes in the established way of giving shape to public opinion. In the same way, unplanned urbanism, how forms of solidarity are injected into the city, or how those who are less visible are made more visible, are all areas that drive to stretch the research parameters of urban interaction design.

As mentioned previously, we have also seen this professional-amateur phenomenon labelled in economic terms as the 'prosumer': the breakdown of the clear separation between supply chains of services and goods in both the supply- and demand-side so that consumers simultaneously become producers, and vice versa. Digitally mediated resource-sharing systems with attached business models are prominent examples of this phenomenon, such as the accommodations rental company Airbnb, or private housing units powered by renewables that sell their excess electricity back to the power grid.

Conflict as Catalyst for Action and Change

Theoretically and practically, the digital divide is inextricably intertwined with social exclusion. For informal, or socially excluded populations, accessing and utilising basic information technologies and social media brings with it the potential of social value, through citizens using services to intervene in, or disrupt, dominant political society in meaningful ways by injecting themselves into relevant layers of the urban stack, as it were. Similarly, understanding the use of information technology within informal communities presents a perspective that can lead to partial explanations of this complex social reality.

This section argues that informal communities, though socially excluded and subject to the disadvantages brought about by the digital divide, are still presenting important disruptions to dominant governing paradigms, and provide a rich context which intersects with, and is important to, the field of urban interaction design. In return, the field of urban interaction design can help invested practitioners and researchers better understand how informal communities connect through available social media tools to have an impact on formal cities and policies. This trajectory in the field's research can provide guidelines for assessing the

implications brought about by the use of simple existing technologies harnessed by informal and low-income communities, whose contributions to societal change are often overlooked by the larger IT community. These trajectories contain value for the fields of urban planning, economic development, e-governance, geography, poverty studies, and cultural studies amongst others, as well as DIY agents, activists, and a host of other practitioners that come together under the umbrella of urban interaction design.

Basic SMS technology and social media sites such as Facebook have already fundamentally changed the way these informal communities galvanise around social issues. Facebook, the preferred social media channel in Brazil, is the dominant platform used to connect people living in the dense urban favelas of the country's two largest megacities—São Paulo and Rio de Janeiro. In fact, Facebook was the platform that energised the country's protest movements of 2013, in which a million people took to the streets in massive demonstrations.

Together with flash mobs enacted by poor Brazilian youth, and the rise of the guerrilla journalist collective Mídia NINJA, urban interaction design reflects an emerging trend that is triggered by the use of basic networked platforms, one that has led to a major disruption of services and shaken the political dimensions of this highly urbanised society. In Brazil, social networks have had an impact in other ways. For example, groups of poor, mostly black, teenagers have been attempting to emulate the generic globalised trend of hanging out at the mall on weekends in flash mob events they call *rolezinhos*, or in English, 'little strolls'. Though *rolezinhos* date back to the 1970s when the country's first malls opened in São Paulo, they have changed in size and impact as a result of social networks and are now activated by Facebook campaigns. What these *rolezinhos* have revealed is the massive class and racial divide that characterises Brazil. By making the poor's largely invisible presence visible, they expose a fresh way of seeing the country's massive economic divide, which some have called an informal apartheid. In late January 2014, more than 9,000 participants signed up to attend a recent *rolezinho* in one of Rio de Janeiro's most fashionable shopping destinations, Shopping Leblon, which is frequented almost exclusively by chic, white, affluent consumers. The threat of the event alone shut down the upscale complex and evoked a strong police response.

Even though several million Brazilians now have the money to purchase more consumer goods than they did a decade ago, many continue to experience the reality of social exclusion. The results of these events have been seen as a success to many of the participants, whose only other experience of frequenting these types of malls is to work in them. Even though the intent of these gatherings is not theft or vandalism, but about having a fun day at a mall, the disruption has gone beyond police retaliation and the closing of streets and services, allegedly reaching President Dilma Rousseff herself, who has reportedly held meetings on the subject of this phenomena. In a kind of a symbiotic response, *rolezinhos* have

been becoming more political in nature, and are starting to reflect the growing mood of informal communities who are suffering forced evictions and increased social and racial discrimination brought on by the 2014 World Cup and the lead up to the 2016 Olympics.

Preceding the recent resurgence in rolezinhos, the massive protests of May through August 2013 gathered its supporters largely through the Anonymous movement's Facebook presence, which created new pages to direct people to each new protest.



SMARTPHONES AND GAS MASKS — NEW MEETS OLD IN RIOT GEAR.

Hacking Attitudes Take the Streets

The protests of 2013 saw the rise of a new phenomenon, the Mídia NINJA movement, grown from a mix of amateur and expert journalists armed with smartphones, cameras and gas masks—the new tools of street protest reportage in Brazil. Protests were originally spurred on by a dispute over bus fare hikes which resulted in a series of brutal police crackdowns and led to a groundswell of national protests about a range of grievances including inadequate public services, economic and racial discrimination, nepotism and corruption. During the months of protests Mídia NINJA was on the frontlines, recording and live-streaming almost every conflict with police, recording demonstrations outside the home of governor Sérgio Cabral, at the occupation of the city council, and at the marches of the TV Globo media conglomerate headquarters. Though the demonstrations largely dissipated by the end of August 2013, this journalists' collective continues to grow in influence and size, providing a channel for popular discontent with politics—and a public voice of dissent. Mídia NINJA now claims over 2,000 collaborators in more than a hundred cities, with a Facebook page that has more than a quarter of a million 'likes.'

Using social networks as broadcast and publishing platforms, Mídia NINJA has exposed illegal police infiltrations and unlawful arrests. For example, during the Rio protests they filmed a police officer, disguised as an activist, who allegedly threw a Molotov cocktail into a crowd to incite violence. Though the police denied the claim, the footage was broadcast by Globo TV and others, and later served as evidence for the defence of a wrongfully arrested protestor. As amateur content creators, the NINJAs are leaving the mainstream in their wake, fearless in the face of being teargassed, beaten, and shot. This, together with their staunch commitment to neither cutting nor censoring their footage, has promoted deep respect for the group and gained them a devout following. The group has its roots in a cluster of student cultural collectives known as Foro do Eixo, founded in 2005. It is present in 200 areas, and includes, among other civic economy enterprises, an alternative university, a political party and financial system. Mídia NINJA was formed as the communications arm of the Fora do Eixo movement. In Portuguese, the NINJA acronym stands for independent narratives, journalism and action. Its initial role was to broadcast concerts and conferences, but it rapidly began covering incidents in the favelas, small-scale protests, and other political events that mainstream media did not report on. As the protests in 2013 swelled to more than a million people in over 50 cities, the profile of the NINJAs grew. Much of their reportage was filmed and broadcast live from mobile phones. Other material was gathered from images posted online, or forwarded to the group. Anonymous points to their work, they are collaborating with the Bar Association on issues of media freedom and police brutality, and even Brazil's mainstream television and print media, Globo and Folha, now follow the movement and acknowledge their impact on the country's media framework. Mídia NINJA relies heavily on volunteers and

donations for living and travel expenses, accommodation, equipment, and even a communal clothing bank. They keep their overheads low to encourage as many collaborators as possible.

What these examples show is that the overwhelming amount of corporate, profit-driven and lowest-common-denominator media is being displaced by consumer accessible, networked forms of storytelling and information dissemination. Rather than remaining immersed in Hollywood and TV fantasy, access to these tools is allowing, and one could even argue motivating (some), to participate in the world outside their front doors.

For those communities who suffer from social exclusion, as numerous studies have shown, the caricatures presented by today's industrial-entertainment complex can be particularly destructive. The groups and fields forming around urban interaction design strongly suggest that the best way to learn to deconstruct media is to create it, often embedding critical and alternative reading in the process. Through this premise, the field can track, promote, and more effectively engage with emergent leaders and motivated individuals, who tell their own stories through the use of digital tools by circumnavigating the mainstream media.

By supporting the uses of networked video and other modes of communication to democratise storytelling, urban interaction design explores how the urban media landscape is changing, and can be changed, as the traditional media gatekeepers (print, online, radio, and television) are being challenged by the rise of the digital and amateur content creator. The goal of this trend within the field of urban interaction design is to announce the active presence of local communities and to make important information about a range regional issues (that likely connect to global issues) accessible to the general public and underrepresented communities. The field also promotes participation through developing open access tools to advocate for and engage with self-actualised social transformation, such as building platforms to amplify the voices, thoughts, stories and opinions of often marginalised or disenfranchised communities.

Blurring Disciplines and Professions

The disruption of clearly defined lines between who stands as active/passive or consumer/producer is the case for most of the disciplines involved in urban interaction design. For example, who is an architect or an urban planner in a time when dynamic city building is gaining more and more traction? What is urban computing in a time when we have technologies available that make it increasingly easy to become an active maker of tangible devices that reshape the experience of urban life? And how can this not be political? What is design? Who is a designer?

Cities turn out to be the perfect scenario in which this tension becomes critical. The analytical lens we are using to define the role urban interaction design can play in cities directly relates to what citizens expect to do in their cities: have their say in such a practical way that transforming their own particular physical realm, as individuals and collectives, becomes possible. Combined with increasing global urbanisation, this issue is raised to the top of the international agenda.

The current exploration of this developing field acknowledges or supports the idea that urban interaction design practitioners, whether coming from an original focus on physical, social and/or technological aspects, are occupying the space traditionally expected to be served by professionals with a formal mandate to act as such, either legally or by other means of entitlement and institutionalisation. The different layers of city life have been infiltrated by new 'rules' that give access to new actors to intervene in all spheres of life, in order to propose practical transformations. Physical transformations of urban spaces are increasingly triggered by communities and instigators who are hacking the city with their hands or, at least, showing by example, the contradictions of how cities have been built thus far.

Building Cities with Our Hands

Municipalities, urban developers, property owners and other established actors that embrace the classical approach to urban planning are facing the pressure of new actors wanting their hands in the pie of city making. The desires and demands for a real and practical possibility of transforming the spaces people feel engaged with takes the form of direct action, appropriation and activation, with the protagonists of this reshaping not being the expected ones. This is the case, for instance, with a long tradition of activating underused public spaces – neglected factories, abandoned open spaces or unoccupied housing. From the most permanent strategies to the very temporary ones, the development of these projects is, in many cases, fundamentally driven by non-professionals. This leads us back to the question "Who makes the city?"

Activating urban voids by turning them into community resources means directly and physically intervening in the fabric of the city in order to make it useful for citizens. This requires collaborative involvement from a variety of community stakeholders who come together to design or programme underutilized space to fill the gap between institutional power and the abilities of communities. Projects like El Campo de Cebada (Madrid) and 596 Acres (New York), along with thousands of others, embody these ideals in practice, fusing community organising, legal advocacy, and urban interaction design into networks committed to breathing new life into neglected urban space through a variety of community initiatives. 596 Acres has coordinated, mapped, and provided legal advice to dozens of Brooklyn communities to help them access and transform some of the borough's most derelict public lands into community gardens.

The transformation of urban space can also occur in immaterial ways. This is the case with the many mapping and visualisation projects that generate visibility, raise awareness and positively promote identity.

Alternative Storytelling for Community Identity

A beneficial exchange of design tools and interactive technologies thought to be meaningful in particular local contexts can be a catalyst for further changes. Projects like Map Kibera represent the crucial contribution citizens can make through the use of consumer technologies to impact, influence, and improve their communities. The Map Kibera collective cartography project gives voice and presence to a large slum in Nairobi, Kenya, by building a network of citizen contributors to create a digital map as a resource to collect and visualise community information. Supported by open platforms and capacity building methods, this community of practitioners is an inspiration for those seeking to explore the transformative potential of technologies. Map Kibera also forms part of a global repository of projects such as Visualizing Palestine, Digital Matatus, and so on.

Another undertaking motivated by professional-amateur mapping as an approach within the urban interaction design paradigm is an annotative research project initiated by the informal urban remediation project, Green My Favela (GMF). This project was created to map the garbage that winds its way ubiquitously through Rio de Janeiro's Rocinha favela, from São Conrado to Gávea. Drift Rocinha, as the project was called, was created in early 2013 using the MotionX iPhone app to track, plot and gather data on the garbage problem in Rocinha.

The project was driven by a request from the secretary of the state of Rio de Janeiro's Social Assistance and Human Rights Department. GMF had been asked to advise on how to establish a trash-recycling programme in the schools inside Rocinha. The project began by investigating the feasibility of installing a municipality-supported recycling programme along Estrada da Gávea, the main road of the favela, to better deal with the enormous trash problem that overwhelms the favela's 180,000 or so residents.

GMF photographically geo-tagged the critical garbage sites along Estrada da Gávea, and another arterial walking route, Rua Um, where trash buildup has reached critical proportions. This process involved speaking with the trash pickers already working at several points along the way to gather information about how trash could be collected and recycled, what types of trash were most profitable to be recycled, and how it should be sorted. The GPS-tagged photos were marked as wayfinding points on a Bing map, and the information

was used to identify potential recycling sites. Information was also used to relay back to the state how recent garbage problems had been exasperated, what could be implemented in order to benefit the picker community, and how this could be achieved. Though the results have been limited, and working with the state to act on this kind of solution is slow-moving at best, some progress has been achieved. For example, Rocinha's Cultural House (one of the wayfinding points) was a critical example of an area in need of garbage removal. The efforts of GMF and the Drift Rocinha project, in part, influenced the municipality to clear the site of trash. Another wayfinding point tagged a garbage pile that used to be a children's playground. The mayor of Rio, Eduardo Paes, had run on an electoral platform to install a trash compactor at the site. The playground was subsequently cemented over and designated as a place to dump garbage. The compactor, however, was never installed, and the site has developed a major rat infestation. Signs now fly above the trash pile calling for the mayor's impeachment.

This kind of urban interaction design mapping can be used to enhance and augment understandings of environments through geo-referenced, spatial compositions that can construct and share user-generated information about communities, neighbourhoods, and regional phenomena. Whether these documents stand alone, are used in partnerships, and/or through interaction with other actors, they provide a valuable way to examine and monitor urban cultural systems and point to how they can change.

It Matters Who Makes a City

All of the examples offered, and the disruptions they illustrate regarding who makes the city, are particularly critical for the domain of urban interaction design. They constitute both an invitation to rethink institutional frameworks (regulations, public officials, politicians, administrative procedures, permits, etc.) and the potential of the field to help disrupt them in a way that makes the aspiration of having more freedom to reshape our cities a reality.

These kinds of actions or activities may use different sets of tools, approaches and rationales, but all share the common ground of enabling citizens to take action to implement change in their surroundings. In this sense, citizen science projects can serve as an inspiration and a mirror to look at. Many projects are taking advantage of available technologies to build collectives of active citizens devoted to environmental monitoring. Examples like The Public Lab in New York show how, beyond the public infrastructures in place for environmental monitoring (air, water, etc.), there is a new space to build additional and alternative-monitoring infrastructures based on open technologies, collaboration and capacity building. Their initiatives rely on a mix of inexpensive, practical and easy-to-build designs that creatively utilize available technologies

to produce user-friendly devices that are attractive to non-professionals concerned about environmental quality of life issues. As such, Public Lab represents a practical collective of how non-professionals – in the sense of not acting as officially authorised agents – can build tools for raising awareness in the gaps where the public authorities fail to be transparent or include communities not served by a public monitoring network.

It becomes evident that the map of agents that urban interaction design works with when designing and enacting projects in urban space is enlarging, and the demarcation between amateur and professional is shrinking. At least this is the case when citizen-centered urban interaction design intervenes in the dilemmas currently presented by top-heavy city management paradigms. To reshape the city represents a challenge. Urban interaction designers must look at the role they play in the way city projects are designed, approved, financed, supported, or quashed, and how the integration of a range of actors at different levels in the urban domain can be ethically cultivated and sustained to make more desirable cities for people to be in.

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Rethinking City-Making Institutions

As stated previously, we see a clear trend of city-making institutions not knowing exactly how to respond to the changes reflected in the forming field of urban interaction design. In what follows in this chapter, we briefly explain these challenges and offer our first guess at what contribution urban interaction design can make to reframe the articulation of institutional tasks and citizen needs.

Over the last century the process of city making has grown into a professional field that has become separated into a number of relatively stable sectors; these provide solutions to needs that are clearly aligned within each sector. For example, this could be the chief urban planner of a city providing zoning plans, and the IT department delivering information technology systems to support it.

As outlined in our discussion of the city as platform previously in this work, this constellation has become increasingly challenged in the last decade by a number of developments. The budgets of governmental organisations to carry out their specific tasks are under pressure; meanwhile the rise of networked society has opened up the domains of various sectors to other organisations and citizens. This means that the many institutions that were traditionally and formally empowered to be in control of city-making processes are struggling to react to the movements reflected by the the emerging interdisciplinary field of urban interaction design and the aspirations for an opening of the 'rules' of city making.

On the upside, we also see a trend in which a number of public authorities are moving away from their silos and pyramids towards more fluid constellations of dynamic groupings in networks coming together around task solving, sometimes referred to as multi-helix organisational architectures for decision and policy making.

Authorities are addressing this issue in two ways. First, various sectoral organisations have started to hire employees with the capacity to work interdisciplinarily on various issues. This often creates a tension between well-established evidence- or tradition-based professions and organisations working with 'new' employee profiles who have trained themselves using methods and tools drawn from the shared field of urban interaction design. For example, this could be an urban planning department hiring people who are not traditional specialists such as geographers, architects or urban planners, but rather bringing in practitioners with new kinds of profiles coming from quite

different backgrounds, such as people with strong communication skills and experience in using social media tools.

A second strategy taken by sectoral institutes is to renegotiate external partnerships or form new ones with different actors. The idea is that renegotiation or the new formation of partnerships with those who are better aligned with the institution in question will enable them to come together or pro-actively position themselves better strategically in relation to some issue. In this case, physical co-location with other organisations, or breaking away from the siloed physical distribution of the members of the institution, is a concrete sign of response.

Both approaches often lead to a situation in which the boundaries of the original organisation comes into question. This can cause tension, as it can be perceived as a provocation towards or a challenge of the institution's original mandate. A classic response to such a change, for example, could be a concern from a specialist that such a reorganisation is clashing with expert decision-making and solutions, like an urban planner who is afraid that mistakes will happen and quality in planning will decrease. Another concern could be a university professor who voices worry over the dilution of his or her field.

The tension arising from this trend then becomes a debate about whether one organisational architecture or another best serves the goals of society—whatever the measures employed—be it economic, social or environmental, to name the most obvious. In the end, urban interaction design must ask what sorts of changes in organisational charts can better serve the complexity of urban management? To what extent can this new field contribute to imagining and making them real? How does the field introduce political and institutional relevance to our practices so they can make a difference in urban policies and the work of public institutions? How can we connect the dots of public policies and citizen actions to build stronger initiatives that do not run in parallel to or even through contradictory paths?

The main question here is how institutions created on the paradigm of sector-based city planning respond to the city-making perspective of urban interaction design. To address this issue we zoom in on the reaction to these trends by two institutions: the regional e-government information system e-DolnyŚląsk set up in Poland, and the approach taken by the Meaningful Design in the Networked City programme at Rotterdam University.

e-DolnyŚląsk

The regional development of Lower Silesia, Poland has put in place an e-government information system known as e-DolnyŚląsk, with the aim of developing an information platform with various functions. It provides tourist information in a number of languages, gives information about planned ventures, gives access to open datasets such as maps, and provides various crowdsourcing tools and other governance applications like modules for civic budgeting and public initiatives. Different kinds of users (citizens, administrators, visitors, investors, researchers, scholars, etc.) can organise cross-field debates and manage information flows, thus contributing to closing the gap between traditional planning systems and civic organisations. Driven by the European Union's push towards developing the information society as a tool for regional development, the project is at the core of the political transformations that European post-communist countries are experiencing in the last years.

Poland, like other newly post-communist countries, experienced an immediate system change. The big turn from a government-planned economy into egalitarian social relations had significant influence on spatial planning. The sudden switch from strongly centralised planning to the decentralisation of public ventures made the new governments and local authorities face completely novel challenges like the re-organisation of the economy, policy, society and adaptation to capitalistic rules. Post-communist countries very often, instead of catching up, try to leapfrog and introduce even more advanced tools, solutions and systems than those operative in older democracies. The case of Wrocław, for example, illustrates a huge step made by the introduction of the e-DolnyŚląsk Platform, which both uses and introduces many Western European countries' experiences and tools at the same time within the same concept. Never before has such a large, complete, multipart, and lavishly funded platform been used in public institutions in Poland.

Once the importance of the e-DolnyŚląsk Platform was realised, it began to shift the ways authorities and citizens interacted. A new phenomenon in the Polish context is the provision of data about spatial management processes. This is a significant change for institutional foundations that used to keep their archives and documents almost inaccessible to the public. Thanks to e-DolnyŚląsk the public can now actively contribute to datasets, and public involvement in space, urban, city and region planning is promoted. This was accompanied by new institutional arrangements towards more interdisciplinary and accessible organisational sets. This more open attitude signals critical changes in the political traditions of the country, from involving citizens in decision-making processes and management to promoting denser links between urban actors.

From this example, we can conclude that managing regional development processes is becoming more and more interdisciplinary. This perspective, however, presents governments with even bigger social, economic, and political challenges. Engagement of inhabitants, communities and different specialists is necessary to deal with and foster city or regional transformation. The pressure on public involvement together with a development of new technologies, stimulates the evolution of new forms of interaction between citizens and authorities that fit/reflect forms of interactions that already exist in less formal realities. This particular case also shows another tendency: in countries with a less mature democracy and a different tradition of public involvement on one hand, and less intensive development and implementation of new technologies on the other, it is easier to realise a big venture and change the entire system than to adapt it step by step.

Rotterdam University

With the programme Meaningful Design in the Networked City, the research centre Creating010 at Rotterdam University aims to investigate the role of design, how it impacts society, and the dynamics at play in the city by using urban space as a kind of 'living lab'. Put differently, Creating010 studies how design process, on an urban interaction level, can be people-led, thus widening the scope of the stable educational institute which trains students in the field of communication, media design, and ICT. Consequently, students also have the opportunity to practice their interaction design skills at the level of urban interaction.

Using the city as a living lab enables students to take the dynamics of urban environments into account while exploiting omnipresent technologies that might impact people's personal and social living milieus. Using the city as a living lab also enriches students' learning experiences and offers the curriculum a wealth of opportunities. Exemplary projects focus on the border of interaction design and urban design, such as alternative ways to create value in the public domain, or how citizen actions can influence local policy. When these projects are well aligned with strategic organisational goals, they become an opportunity for governments and companies to change perspectives as well. Partners from municipal governmental institutions, like urban planning or environmental services, may learn the value of having open space for experimentation and embrace a place where disruptive ideas are welcome. Moreover, student prototypes function as 'boundary objects', items that are used to explain the concepts to others.

The active participation and co-participation of multiple partners in the early phases of idea generation has now put open data on the local policy agenda of

the Rotterdam municipality. The board of management of the city council decided to allow the release of the city development service's public sector information in an open data store. In addition, Rotterdam Open Data has introduced participating creative industry partners to the potential of using and re-using public sector information. Citizens also play a role in providing input for the creation of prototype applications, which in turn act as concrete examples to illustrate the benefit of the co-production. By encouraging public servants to free up more public sector information for re-use, potential fuel for other service design applications was created.

The final event where applications were presented also acted as a platform for partners with different strategic backgrounds to meet and discuss the developed applications. The partnership between academia, the creative industry and the public sector was awarded with additional research funding for two projects to further ensure the release of public sector information. Through securing the participation of crucial partners, a sustainable infrastructure has been created to co-create public services and foster further advancements in public sector information.

However successful these projects are, tensions continue to be found in the conflicting agendas of departmental and institutional goals that are not always aligned, and clashes between community aspirations and hierarchical urban policies remain largely in place. But this does represent a starting point: driven by societal changes, the networked society is raising new dialogues and bringing forward new representatives to be substantial actors in the process of city making. Urban interaction design can help build artefacts, processes, solutions and mediating concepts to bring these new desires closer to fruition. We are still at the dawn of a new generation of institutional interfaces that can close the gap between the layers of ruling cities and the layers of using cities.



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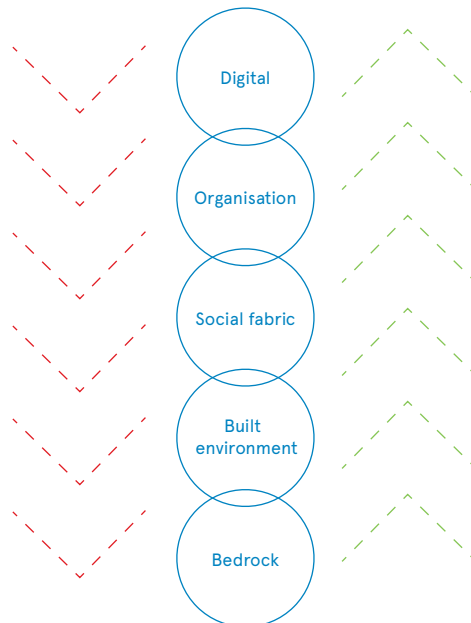
Urban Product and Platform Reciprocity

An important trend or development in urban interaction design is the rise of what we can call product and platform reciprocity. This means that products or services that are designed as a platform to do a particular thing can be used on another level for a different type of programming. What is one person's product is another person's platform, or in other words, urban public space is both shaped by and shaping the digital technologies, media and materials that are becoming increasingly formative to communities. When being conscious of this reciprocal relationship, urban interaction designers become part of what Christopher Kelty has coined a 'recursive public': 'A public that is vitally concerned with the material and practical maintenance and modification of the technical, legal, practical, and conceptual means of its own existence as a public.'

For example, just as the Booktype platform that we are using to write this book is an application running in a browser, it is also a platform for making publications and a facilitated service in the shape of a Book Sprint. The code is open source and licensed in a way that allows you to change it if you want. You can also just use it to collaboratively write and publish books. Your choice. Apple iBooks is an e-reader (iBooks), online book store (iBook Store), and publication creation tool (iBook Author), that are in many ways similar to Booktype. The main difference is that the production tool is not online or collaboration-oriented—the user cannot change the conditions of operating within the platform's confines, due to both a closed source code, and to licensing restrictions. This is what Pold and Andersen refer to as 'controlled consumption'.

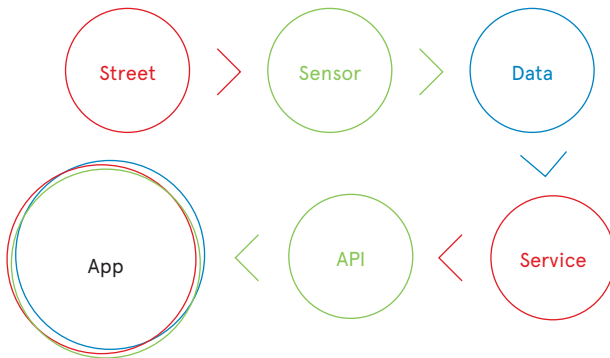
Foursquare is designed as a platform that lets people exchange information about where they are, and write reviews about the places they like to visit. The dataset that is collectively produced in this platform can be used as content for programs outside of Foursquare. For example, Blindsquare is a navigation tool for blind people developed in Helsinki, that helps them find their bearings in the city through location-based audio descriptions that inform them on their whereabouts. Thanks to the openness of its system, the platform Foursquare feeds into the Blindsquare program and helps the visually impaired to not only find their way, but also gain a sense of place by listening to the descriptions added to Foursquare's database. While this product and platform reciprocity opens up a number of opportunities for urban interactive designers, there are also a number of risks that need to be addressed.

In order to conceptualise this, it is beneficial to approach it with a few descriptive models that highlight specific aspects of program and platform reciprocity in the networked city. We start by describing this in a vertical way, drawing on Adam Greenfield's description of the city as an 'urban stack'. This idea comes from the arena of computing and describes the dependencies that stem from the hardware layer as you move vertically upwards. Following the hardware, you'd find layers of different software abstractions that then make their way up to the operating system or the browser, which we all know, can serve as a platform for more. When translating this idea into thinking about the city, the bedrock and underground infrastructure is at the bottom of the stack, and moving above this you'd find the built environment, social fabric, and other multiple abstractions that organise and govern across communities, companies, institutions, and so forth. Somewhere at the top of this the various digital layers are found, albeit they are slowly seeping down through the stack. Understanding the city as an urban stack highlights two important points: each preceding layer preconditions and affects the subsequent layer when moving up in the stack, and moving down the layers in the stack changes the pace, involved disciplines, issues, and stakeholders. Changes made to the bottom of the stack, for example, when developing a new subway system, or when a city switches from driving on the left to driving on the right, as Sweden did in early September 1967, are both costly and happen at a different pace than changes made to the transit/bus schedule on a municipal website.



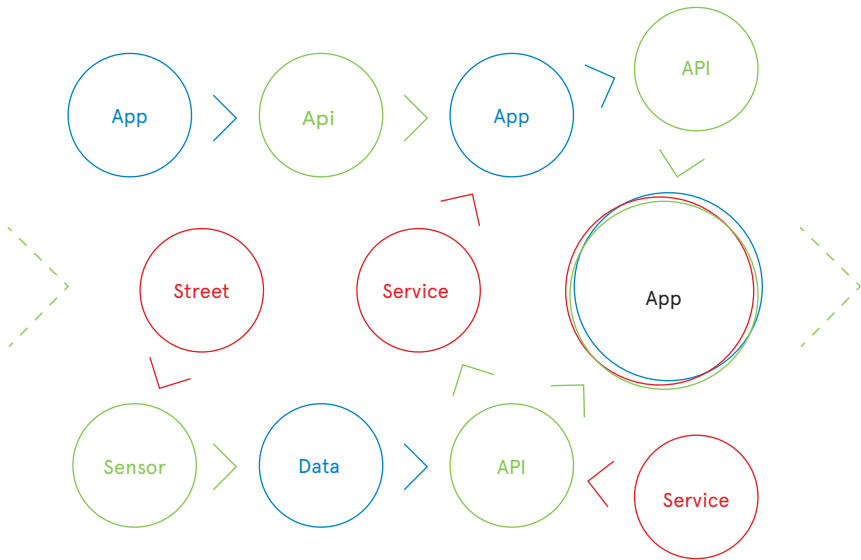
If we look at this with an analogy of a chain in mind (see figure below) that resembles the established value chains within sectors and markets, or the service tool chain from traditional interaction design, we retain the idea of how previous steps precondition the following link in the chain, or rather, in the urban stack, highlighting the vertical chain of interdependencies and how these introduce a different type of tension or weakness. In more traditional areas, where a service or application relies on something to be handed over from the previous chain link, for example, data, information or a supporting service, the top tier program only functions as long as the chain is intact.

This perspective becomes particularly interesting when the chain cuts across governing actors or standardisations within a sector. In business management, for example, this has led to looking at integrating the links in the value chain as a way of retaining control throughout the system. However, this is not possible in the networked city, so we rely on opportunistic protocols; these are a technical implementation of a set of shared rules, licences, or organisational agreements designed to ensure the trust and health of the system. But changes within a given service still bring the risk of initiating unintended (and intended) changes throughout the chain, or an opportunity to inject something that someone needs into the stack. The question here is: is this a task for a regulatory body or do we need a different kind of trust and resilience to cope with ever-changing links?



This is a simplification of the work or information flow that occurs across a given system, but it highlights a weakness when thinking about programs as platforms across proprietary systems or services, often beyond direct control. When Foursquare changes its access conditions, is bought up by another company, or just decides to no longer offer the data in their platform through an open API, the blind in Helsinki will lose their service. The reality of the networked city is even more complicated,

as the illustration below shows. Multiple, and at times idiosyncratic, services go into a given system, each relying on yet another layer of components, services, information and infrastructure. Blindsquare does not only rely on Foursquare, but also on Apple's Voice Over technology and Acapela's proprietary speech synthesis technology. It ties in data from GPS satellites, relies on mobile phone subscriptions or (in Helsinki) the free city WiFi network offered by the Finnish game developer of Angry Birds, and so on. All of these systems may change their conditions of access or use, or simply cut off a service. Twitter continuously tries to protect their space through imposing restrictions on their API or acquisitions.



The trends and perspectives mentioned above are still very open, and difficult to trace and pinpoint, but the interplay between the physical city, which is most of the urban stack, and the ecology of artefacts and services that is the result of program and platform reciprocity, is something that affects how we read, write, use and change the city, and how we approach city making.

Changes in the physical layers of a city, such as adding sensors to measure traffic or air pollution, offers possibilities too, altering how we can represent and instrument the city, while changes in data representations or tools made in the digital layers of the stack or across the chain can change how we use the city, for example, through the ability to organise flash mobs or annotate places with images.

Street Furniture as a Commercial Platform

How the urban landscape is shaped seems rather static at first glance. But this is not usually the case in a city. For instance, JCDecaux, one of the largest outdoor advertising corporations, provides free street furniture in exchange for their right to manage and sell the space around bus stops as advertising spots in the city. Someone identifies the need for seating or an enclosure around a bus stop, it gets drawn up, budgeted and installed. The company owns and maintains these installations, and has a digital infrastructure to manage the advertising content. This is already evolving and the company has showcased systems where they use near field communication (NFC) to bring digital content into the space around the street furniture. So what essentially is a 'free' product for the city—a bus shelter—is a platform for advertising and related ICT infrastructure.

This business model is a form of city making that shapes the space around the street furniture, especially if the NFC technologies or urban screens become a window between the physical and the digital. This will surely have an affect on how we use the space and how the space is read. What was once a worn down bench with a static advertisement has now become attractive street furniture, cleaned and maintained weekly because the company protects its investment. This also hints at another issue, namely, what happens when the incentive for rolling out infrastructure does not reflect the needs of the city or its citizens, but rather, is representative of a commercial perspective that, in this instance, sees an opportunity to gain more advertising space?

Another tension worth considering is what happens when one provider and their products dominate the urban landscape, not necessarily because the products and services are widely requested by citizens, but because they have a monopoly on the delivery of the service. Not only does this mean that we get uniform, and for some, boring urban street furniture, but we also get a monopoly on the messages, texts and visuals presented in this public space; the language of advertising and commercialism becomes a very prominent urban visual. With such monopolies in place, who gets access to using the city and the streets as a communication platform? This also shows that for cities and the citizens, there is no such thing as a free lunch. We might get well-maintained and state-of-the-art street furniture, but are we losing access to shaping the city through alternative or non-corporatised narratives and visuals? What happens when the urban space that surrounds this well-kept infrastructure is deteriorating due to shrinking city budgets? Do we simply need the same business model for our parks, neighbourhoods and streets?

A counterreaction to this way of commercialising urban space is seen with São Paulo's attempt to rid their city of advertising and business branding with their Clean City Law. The city prohibited all outdoor advertisements and branding on 1,500 billboards that were removed because of the legislation. According to

the website Amusingplanet.com, citizens found the ban beneficial and the city economy was not destroyed as critics had projected. Interestingly, when São Paulo reintroduced advertising back into public space in 2012, JCDecaux won a 25-year contract for 1,000 city clocks that double as digital advertising space.

Two Ways of Thinking about a Map Service

Map applications, tools and services that provide map services or APIs to other developers are an important area in the networked city. We all use a map application from time to time, either through a browser or on a mobile device, such as a smartphone or dedicated (GPS) navigation device. As ordinary users of these applications the provider might be more or less indifferent with a shortlist of expected functionalities. Google is a well-known provider of multiple different map services and Open Street Map is a similar offering: they both provide maps, geographical data, tools or interfaces for annotating and adding new features to the map as well as different services, such as street address and geolocation matching or even complex routing. However, they differ in key areas: Open Street Map is a free open editable map of the world. It promotes free access to the entire map dataset and welcomes people to use and contribute to expanding, fixing and improving the map and/or use it as a map service for whatever purpose. Many of the tools that have been developed to explore, contribute and distribute the map are developed within the community. It is maintained by the community, while the non-profit organisation OpenStreetMap Foundation acts as the legal entity and support layer for the community. Google Maps is a commercial service owning the map data and the supporting infrastructure. The tools that Google provides for annotating and adding features to the map are developed by Google and they curate the incoming data as well.

How people contribute to the two platforms is an interesting difference. In Google you add features, e.g. roads and hiking trails, based on the existing map or satellite imagery, while with Open Street Map, people can create new maps by either using different basic mapping techniques, GPS devices, or by taking pictures or recording audio. In the first instance, the map is centrally curated and contributors can use a dedicated tool to add new geometries, while the latter supports a richer in-the-world mapping practice. In the first, changes and additions remain in the virtual world, while running around in your neighbourhood with a GPS device mapping your city on Open Street Map ties the virtual and physical closer together. This means that what a map is, how it should be represented, and who contributes, is designed into the tools and APIs of a given service.

Another interesting tension is the how, and with what sensibility, changes are being made. While the Open Street Map community has an open conversation

around these changes, Google, as a private company, does not need to justify changes in licensing, pricing and data. In contrast, Open Street Map supports a plethora of tools, programming languages and interfaces, and has created numerous commercial services like Cloudmade.com. This, of course, raises the issue of whether to use a monopoly approach in the service infrastructure as an advantage, or consider the community when making necessary changes. In Open Street Map users actually have a say within the service infrastructure, where often more is added without anything disappearing.

Open Street Map can be seen as a reaction to companies and locked-in models like Google. As with other branches of the open source movement, this creates a space where Google could easily use the data from Open Street Map, collected by the community, without actually sending anything back, given that they adhere to the sharing license. As such, open initiatives can at times consequently strengthen some of the more closed platforms.

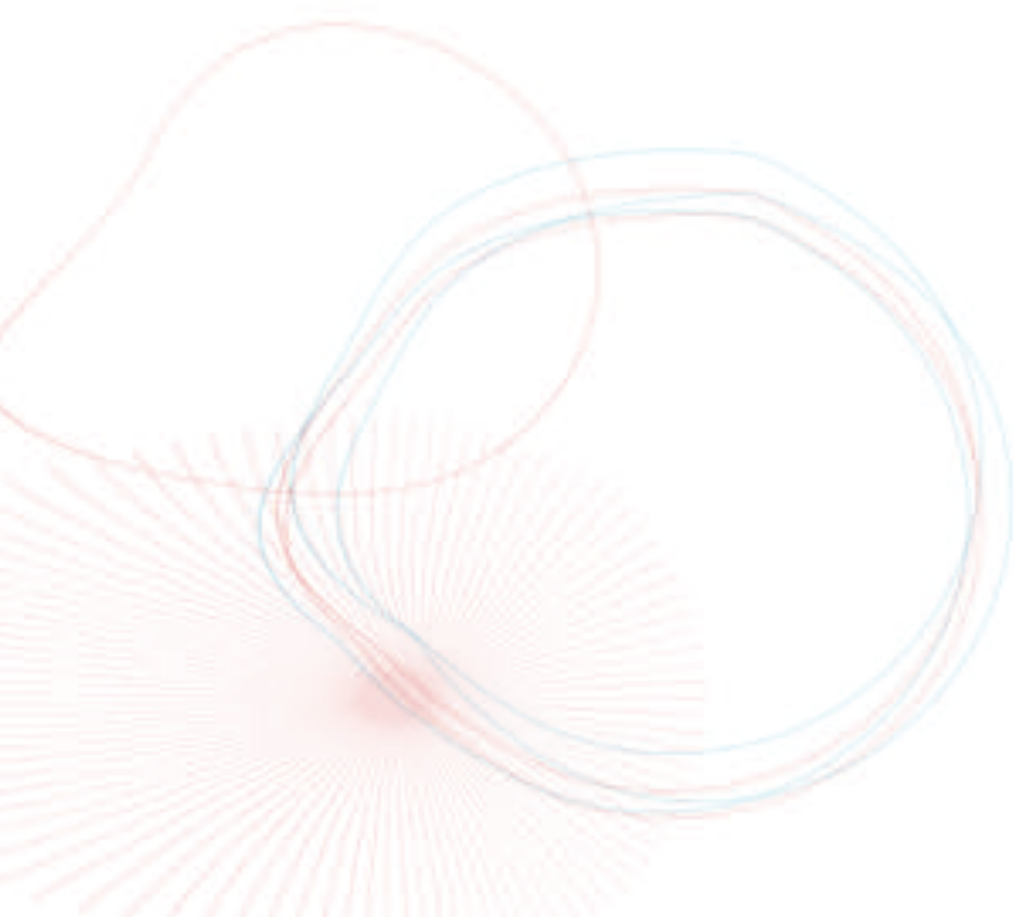
Summing Up

The idea of program-platform reciprocity in these cases raises a variety of issues. It shows a close link between how a service or component deep down in the stack or service chain can affect what is subsequently built on top of it. With the JCDecaux case we see how the underlying business model affects how city infrastructure is implemented, and in this instance, becomes an advertising platform. The trend we see here is an increased awareness among practitioners and researchers operating within urban interaction design who see the need to understand these recursive, algorithmic logics as they spread from technology, through cultural practices into society at large. On a practical level, this means more intimacy with creating and working with software code as a material.

For urban interaction designers this program-platform reciprocity is an important criterion to take into account. Anyone building a service on a social network, understood here as the platform, inherits certain definitions of what it means to be social or who gets access to the underlying platform. What happens when the user agreement changes deep down in the dependency layer, disregarding if it's an end-user agreement, a public regulation related to use of urban space, or a change to the sensitivity of sensors measuring air quality? How can we take these interdependencies into account, and at the same time be aware that changes in the platforms we design may have consequences for users at other levels? For educational institutions, this can be a challenge to establish.

On a policy level this issue is equally important. First of all, to what extent should governments build their programs and platforms on top of the commercially exploited programs offered by international companies like Google as Facebook, over which they have little legislative control? While these platforms may be valuable and offer practical tools, the question should be addressed, to what extent are public services, in a critical way, dependent on the underlying conditions of these platforms? How can lock-ins be divided so that it becomes possible to switch to other platforms once the underlying conditions have been unilaterally changed?

More importantly, interdependency is both a way of regulating and changing the conditions for someone else, regardless of intentions and motives. This could both be a case where someone wants to control or regulate the conditions negatively, e.g. to control a market, area or population, or where simple, sensible changes disrupt peripheral activities.



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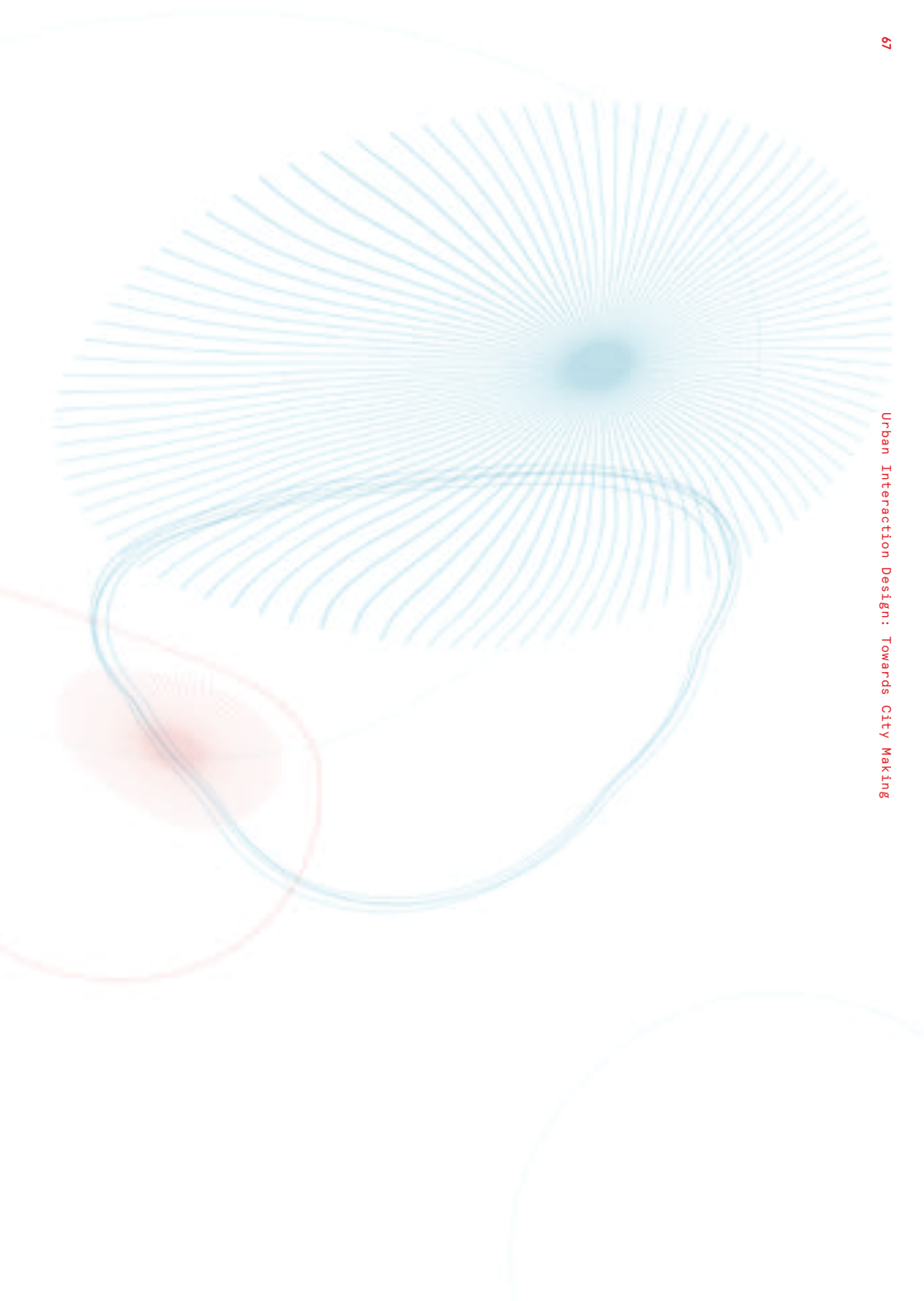
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Sharing Tools for Sharing

When we look at the methodologies employed by the different disciplines that are coming together in the field of urban interaction design, one thing becomes immediately clear: mapping, once the domain of geographers and planners, has grown into a central tool and practice across the disciplines. As already touched upon, platforms such as Google Maps and Open Street Map, as well as the rise of geolocated metadata, have in the last decade or so democratised mapping, making it both an easily available tool for research purposes, and a central object of design for those working in urban interaction design. Increasingly, digital maps organise the city for us. Thus, the way we organise our maps and who has the power to create them are central issues in the field, particularly because maps have the ability to be both a platform for exchange and a tool to share experiences. Simultaneously, however, digital mappings can also sort the city in new ways, keeping experiences or visions of others away from users.

Cartography has always been used and misused to create boundaries. Our mental conception of the city is without a doubt heavily influenced by the representations of the spaces and the borders that are imposed onto it. Networked cartography is by no means different. Within the city, networked maps are affecting the ways in which we both relate to space and establish shared experiences with others.

Using an algorithm to deliver—or avoid delivering—certain information in a networked cartography, automates exclusivity practices.

Here we draw on Stephen Graham's concept of 'software-sorted geographies', in which geolocalised software and the underlying algorithms demarcate the boundaries within which citizens should, or should not, move. In this way, a comfort zone is automatically generated based on the interests of the creator of the algorithm. The 'sorting in' or 'sorting out' of places is also a way to include or exclude entire areas and their residents from spatial practices.

Software sorting represents the not-sharing of space. It is about a self-imposed isolation guided by an automated mathematical calculation. Furthermore, it also promotes closed spatial practices, where the comfort zone is precisely defined by a software tool, and the outsides of those limits are simply forgotten, even though this closely relates to practices of discrimination and spatial segregation. This closed and segregating spatial practice incentivises conflicts over the non-shared things that the city has.

However, deconstructing borders is also a cartographic practice. A critical approach towards networked cartography should elaborate on the boundaries, on the comfort zone that spatial representations and the overlapping layers

of information create. Just as spatial art practices and transnational projects deconstruct borders, a critical networked cartography should bring together different fields to challenge borders that are imposed in the city. The use of network culture and locative media technologies augment the field and open up new ways for practitioners and actors to engage with scientific, social, and environmental phenomena in order to create geovisualisations that connect to the physical environment through a cartographic relationship with satellites—translating data onto a map as points, lines, and parameters. Within contemporary conceptual urban practice, mapping can be used as a method to understand, assemble and share individual and collective spatial experiences. In this sense, from the perspective of urban interaction design, mapping needs to be challenged to go beyond performative aesthetics, instrumental functionality or spectacularised acritical representation.

Contrary to the software sorting of spaces, geotagged storytelling changes our own (pre)conception of the city. Projects such as *MystreetFilms* or *MyBlockNYC*, for example, offer a virtual platform for amateur content creators to represent their neighbourhoods through networked media culture. In doing so they are not only creating a fresh understanding of the city, but also building fully interactive video maps of it.

Mapping can also alter the way we share social encounters with each other inside cities, such as the *phenomena restaurant day*, a food carnival originating from Helsinki in 2011 that happens four times a year, where anyone can set up a restaurant, café or bar in their home or office, on street corners, or at gardens, parks, and beaches. This is an example of the pop-up phenomena currently happening, and indicates how networked cartography is able to breakdown individual comfort zones, pushing us to explore urban space and interact with its inhabitants, by delivering the localisation of others who are also breaking their boundaries. This creates new spatial understandings of place, and provides opportunities that literally allow people to put themselves on a map, and more importantly, on the streets as citizens using the city in new ways. These intermediate or ad hoc hybrid spaces add character to public space, create new public spheres, and (at least temporarily) display the identities of many less visible urban actors. They also bring up issues that relate to larger infrastructural frameworks (in this case the framework around health and safety food regulations).

The Multiple Scales of Networked Mapping

Networked mapping is used to reconfigure the existing presentation of space on multiple scales that allow us to better understand and describe our immediate environment, and articulate the personal within the context of a city, a region, or the globe.

Cartography, in this sense, is closely related to Fredric Jameson's theory of cognitive mapping, the process by which individuals are able to locate or situate themselves within a global space that is normally obscure, and thus unable to be represented. It also even relates to Guy Debord's theories of psychogeography of how the city structure and layout shapes the emotions and behaviours of individuals. Because of the opportunities that networked cartography affords, individuals can now articulate and connect their personal experiences inside the infinite layers of this complex global fabric, albeit with different scales and on different levels. This is why mapping has been embraced by all kinds of city makers and activists as a tool that enables them to localise individual and collective actions. Networked mapping has changed, and continues to change the way we interact with each other, with the stakeholders of the city, and with the people of other cities. As a device within urban interaction design, mapping operates at different levels, such as a tool for exploring the sharing of ownership, the sharing of interactions, the mutual sharing of stories, and the sharing of conflicts.

Personal experience of space can also relate to larger phenomena, such as sound pollution. Sound mapping and acoustic ecology in its many forms are also basic components of locative media practices that are used to enhance and augment our understanding of environments. User-generated, geo-referenced, sound compositions of communities, neighbourhoods, routes, regional phenomena, and other forms of urban micro- and macroecologies use database and locative technologies on many scales. Researchers are just beginning to identify some of the implications of noise pollution in this regard, such as how increased urban noise levels have found to be altering the frequency structure of bird songs. As they deepen their investigations into monitoring our evolving urban systems, many are looking to examine the subtle acoustic shifts occurring. Sound recordings can also be culturally, historically, or aesthetically important documents for this, as well as provide historical evidence of the cultural evolution of urban space. The field of acoustic ecology can be traced back to Raymond Murray Schafer's World Soundscape Project, which was the first recognised sound project to document urban landscape, and one of the first attempts to document noise pollution. The project was created to archive the changing sounds of Vancouver as it began to radically urbanise in the late 1960s. The project popularised acoustic ecology as a discipline—a field that has since branched out into numerous networked practices.

Maps also matter because they can pinpoint conflicts, negotiations, build voice for the commons, and help us visualise multiple dimensions of an issue. For example, mappings of protests, as already discussed, enable us to visualise multiple protest locations, identify key participants who link movements together, and provide evidence of wrongful arrests and police

brutality that can later be used for litigation purposes. This helps the local be identified and networked at a global level. Of course, this is only a small sliver of how networked communication can be driven by citizens to foster social mobilisation. This is also the case of mobile apps and services, which encourage individuals to intervene in issues relating to their environment, to provide responsible institutions with a more efficient way of gathering data on problems with traffic, trash, transport and so on. This human-centred usability and accessibility is a perfect example of how open source, cloud-hosted, e-government applications, designed specifically for local, transparent, authority/citizen interaction to meet city needs, are being articulated within the urban interaction design field. There are many other examples of how municipalities are using open data sets to interact with citizens, such as the Chicago Health Atlas, which uses an open data portal to display aggregated data about the prevalence of specific health conditions on a map.

Other kinds of mapping structures help make visible how our institutions of production and consumption are culturally attached to, or removed from, each other by revealing how urban supply chains work, or how institutions such as schools, hospitals, prisons, and corporate entities control and influence people's habits. The MILKproject is a good example of this. Initiated by Ester Polak in 2005, MILK was created as a way to visually map via GPS the routes taken to transport milk from the Latvian farmer to the Latvian cheese manufacturer and eventually to the Dutch cheese vendors. In another related food supply chain project, Dutch designer Christien Meindertsma traced the body parts of a specific commercially raised pig to 185 items in total, ranging from chewing gum and bone china, to ammunition, medicine, photographic paper, cosmetics, cigarettes, hair conditioner and biofuel. Meindertsma subsequently published a book of her findings, entitled *Pig 05049*. Though her map does not specifically speak to city making, it does provide great insight into how most of us have lost sight of basic knowledge about where our products come from, and how threads of consumer supply and demand function. Additionally, infomaps and visuals, such as those published on sourcemap.com, factoryfarmmap.org, waterfootprint.org or footprintnetwork.org, offer great insight into our global food production, supply chains and resource consumption, and how they link to cities.

Landsat images are also being ubiquitously used as tools to understand resource consumption in cities. For example, these are being used to identify areas for developing green initiatives, to determine indicators of how areas are suffering from social exclusion, to explore how urban slums are contributing to deforestation, or examine how populations are changing in scale.

Many networked maps are focused beyond representation, being aimed at how to make deliberate social impact. A central question in urban interaction design is therefore the issue of how to turn datavisualisation into 'action

maps', in order to provide insights that are actionable. Changing our local food systems to increase access to healthy and fresh food is now an increasing urban phenomena; this connects with networked methodologies in order to develop new models for 21st century food systems.

If well designed and managed, these systems can provide much-needed support to access vacant or abandoned public lands and make them more productive. This kind of work can be seen in the New York based 596 Acres initiative, or the Brazil based Green My Favela project, that works with citizens to develop community gardens in underutilised public space. Through combinations of on-the-ground coordination and co-production, augmented with online tools and maps, these initiatives are being used to clear hurdles to public land access. 596 uses city data to provide information about particular pieces of land and connect people to one another. Green My Favela uses simple social networking functions to build support. In addition, both projects are facilitators between the bottom-up, grassroots initiatives of the people and the top-down stakeholders of municipal government. These projects, which integrate urban interaction design under the umbrella of community action, legal advocacy, government facilitation, and networked design, encourage residents in urban neighbourhoods to take a leading role in effecting agricultural and food policy change and ecological revitalisation.

Just as maps can delimit ownership of place, they can also provide information that can lead to reconfiguring ownership. Networked culture is opening up fresh possibilities, resources, and tools with which to communicate the issues that surround the battle between resource enclosure and the commons, and provides urban resource sharing platforms, like shared car systems, or services that allow us to swap apartments. With networked culture as an interwoven fabric, we can start to see how sharing schemas are impacting not only the notion of ownership, but how it is understood and enacted in urban space.

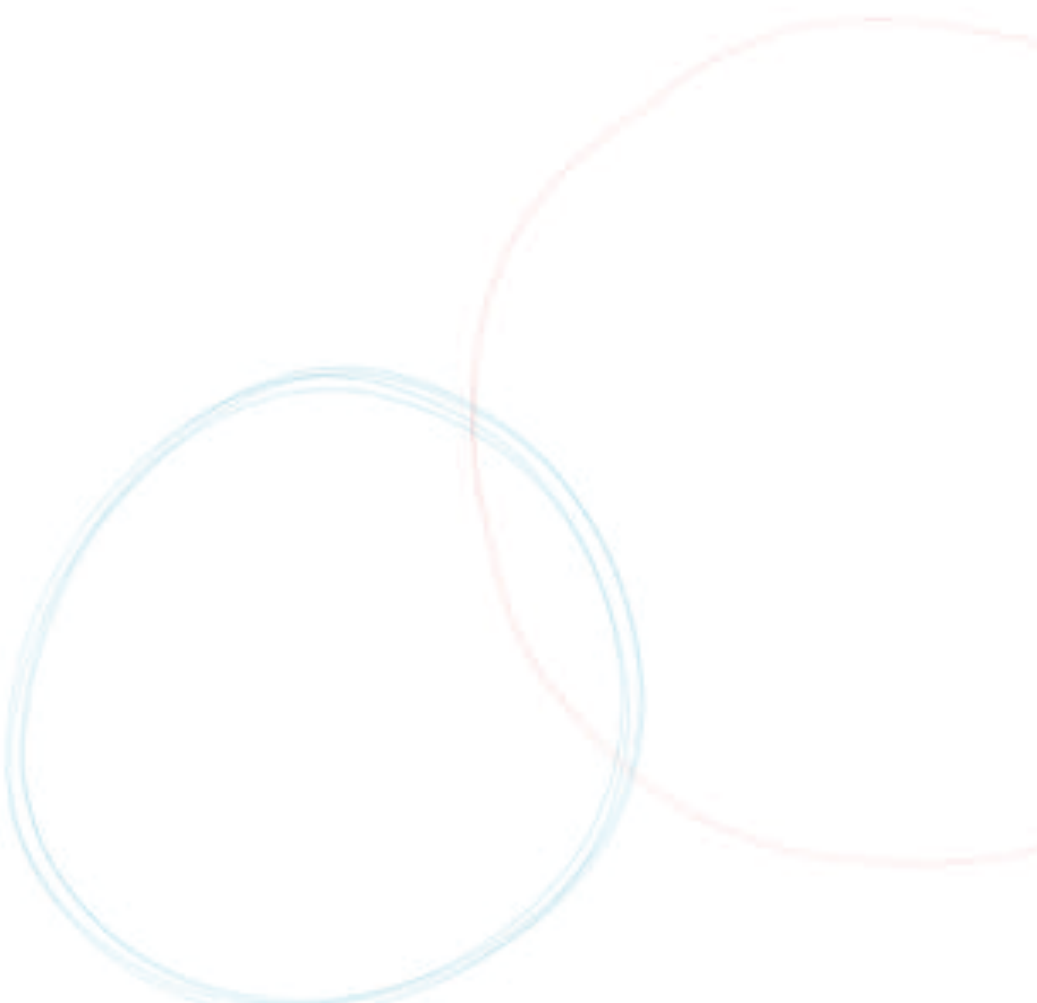
The levels that can be addressed through mapping are almost inexhaustive. The above examples give only a glimpse into how mapping is contributing to city-making processes in integrated approaches that strive to make more productive, vibrant, and desirable urban experiences. By considering how mapping tools can be used to reconfigure the many representational layers of the city, we see a possibility for the city to be both a shared space and a space for sharing.

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Designing for Digital Ownership in Cities

In relation to the production, aggregation and operationalisation of data in the networked city, ownership is a crucial topic for urban interaction design to explore. On a first level, ownership of data is related to issues of identity: do we as private persons own the data that we produce in the city? On a second level, it refers to issues around access to the aggregated data that is collected in the city: who can make use of it and under what conditions? Thirdly, ownership comes into play when we think about what we can do with the data that the networked city is producing. When we can start tracking the individual use of and contribution to collective resources—for instance through reputation systems—it becomes more attractive and productive to share them. Exclusive proprietary ownership—the right to exclude the use of your possessions by others—may take place in a sharing economy, but what does this mean for designing another kind of ownership, the right to act upon a commonly shared resource in the city?

Background: Various Motives for Moving towards a Sharing Economy

The push towards a sharing economy comes not just from technology, but also from multiple perspectives: governmental, commercial and communities all play a part. For the public sector, it is an opportunity to use and mobilise the resources within a city more efficiently. For startups like Uber and Airbnb it is a business opportunity, and for communities it is an opportunity to take local ownership over key material and non-material resources. It is not a coincidence that this happens in the wake of a global financial crisis, and it is not clear how each perspective is reacting and counterreacting. Are commercial actors answering a challenge within society or are they simply creating a new business arena that again challenges the concept of ownership within society? Are communities reacting to a reduction in public services and goods, or starting to take ownership because their neighbourhoods are deteriorating? Is the public sector simply reacting to a request for more local ownership and management of resources? The same can be asked when examining the tension around the push for more innovation with public sector data. While this is driven by more interconnected systems and the ability to collect vast amounts of data, it is also a product of the expectations of economic growth. The core question is what takes precedence: economic growth or a rich discussion about ownership?

Datafication and the Ownership of Our Identities

This richer discussion of ownership is inherently tied to the datafication of our urban societies. A key aspect of digital media is that we use them knowingly or unknowingly to record our everyday activities. We do this in an active way when we post on social networks, check in on services like Foursquare or write reviews about places we visited or activities we undertook. But our activities are also traced when we use our GPS-enabled devices, when we walk around with our mobile phones or when we enter a shop with CCTV cameras or sniffers that scan bluetooth and WiFi channels to register the MAC addresses of our mobile devices.

This terrain problematises a key characteristic of social life: the power or ownership we have over our own representation. It could be argued that every social interaction (with or without technology) comes down to a negotiation over privacy. In a variety of situations, we need to reveal various aspects of our identity. Sometimes we just want to announce our physical presence, in other situations it's our professional status, sometimes revealed by an (informal) uniform we are wearing. At other times it is our names and place of birth that matter, and in other settings we may reveal the most intimate part of our lives. In the networked society, the same principles mediate social situations. However, there are a number of qualitative shifts. First of all, it is the communication platform we choose that sets the protocols for what we need or can reveal about ourselves, sometimes without us knowing that parts of our identity are being recorded. Secondly, this data is being stored and often can be searched for at a later date. This means that parts of our identity can be circulated to non-present publics. And thirdly, this data can be operated upon by algorithms for various services such as friend-finding or advertising. Urban interaction design needs to take all of these aspects into account and consider: to what extent users can set or influence the parameters for what they reveal about themselves, to what extent the data is stored, what opportunity or right a person has to delete data that is registered about them, what information is given to users about how their data is used and by who, and how difficult or easy it is to opt out of a particular operation?

Ownership and the Right to Act Upon Urban Data

In the realm of data aggregation, similar issues exist with regards to ownership. Many so-called smart city visions rely on the aggregation of all kinds of data about urban life that can be used by companies and governments to offer various urban services, from traffic management to street lighting schemes that save energy. For the field of urban interaction design, two questions come into

play: Who has ownership of these datasets? And if access is granted to the general public, is accessibility of this data enough to enable ownership? The first question refers to all kinds of data collectors: from government-sponsored sensor networks, mobile phone companies and GPS-providers to complex smart cities schemes. Some of these schemes are closed networks in which companies who collect the data own the datasets, even if the datasets are collected in public spaces, by contributions from individual citizens. For instance, if a GPS company or local government collects data about car movements in a city in order to sell premium subscriptions that promise to evade traffic jams, should that data be made available to other users as well? Do we need better policy around access to these data sets?

Meanwhile, many cities have already embarked upon open data schemes, giving citizens access to governmental datasets. However, while these datasets may be valuable for citizens with particular skill sets, for most citizens, sets of numbers and commas do not mean anything. They might have a formal ownership over the data platform, but they might not be able to take active ownership over it because they lack the skills necessary to understand or act upon the data. To what extent do designers also need to take this more active ownership into account? Do they need to offer programs that make datasets intelligible, operationable and exchangeable for citizens? And on another level, to what extent do governments or designers need to give citizens a voice in the organisation of the metadata? Data is often collected and categorised for particular (internal) uses, but to what extent do citizens require alternative categorisations of datasets, and how can they take ownership over the criteria of both data and metadata?

Datafication and Ownership of Resources: Towards a Sharing Economy?

The production of data in the networked city may also lead to new forms of resource ownership in society. Some call it the 'sharing economy', others 'the age of access' or 'collaborative consumption'. What these and other buzzwords have in common is that their propagators see a shift in the ownership of resources and products: rather than owning a vehicle that we only use for a few hours each week, we may use a vehicle in some form of sharing scheme.

It's again the datafication of our behaviour that allows for this trend. On the one hand, this development allows for the automatic registration of our usage of a resource. On the other, we can actively contribute, for example, to rating the behaviour and contributions of others in reputation systems. It's the combination of these two that should provide users with trust that there are no free riders who can take from our common resource without also contributing to it. As Adam Greenfield has observed in his book *Everyware*, here information processing is

dissolving into behaviour. Yet this development brings with it its own set of problems to be addressed by actors working in the field of urban interaction design. To what extent are users also owners of their reputations in these systems? What aspects of someone's identity need to be revealed for such a system to work? And can these reputation systems also lead to new forms of exclusion or control? This shift from proprietary ownership to a sharing economy may have many advantages, a more economic and sustainable use of resources being amongst them. Yet it also raises questions about another form of ownership, the right to act, where the owner of a particular resource has the right, and may even feel a responsibility to act. But when we start sharing resources, who then has the right and the responsibility to act upon them? Who can and will take responsibility for the system? To what extent does a shift towards a sharing economy address us as consumers of services rather than as citizens who have the right or feel the responsibility to act upon common resources? As is often the case in urban interaction design, these issues do not have much to do with the technologies used, but rather, with the rationale through which they are conceived and the way that this is shaped into a process.

Airbnb vs. Couchsurfing

Airbnb and Couchsurfing are both online services that claim to work in the space of the sharing economy. They both run on a website, and use similar tools for managing, connecting with, and publicizing places to stay for travellers. Couchsurfing connects to a global community who offer up a spot on their 'couch' for members. No money changes hands with this service. Airbnb, on the other hand, is a rental service that connects people to a range of accommodations—private homes, hostels, traditional bed and breakfasts, and hotels.

Both services help you find a place to stay, however, the underlying model is different in key areas: Airbnb is a commercial service with a fundamental business model that benefits both the rental host and Airbnb. This comes with all the disclaimers, policies and regulations that any commercial actor needs to protect the service and their customers. Couchsurfing has similar information on safety tips for their users, but this is articulated as a set of community guidelines for how to use the service safely.

One of the key differences between these two services is how the sharing economy is articulated. With Couchsurfing, hospitality is seen as a privilege and is loosely regulated through the principles of the commons and shared responsibility. According to Couchsurfing, you should trust your instincts and have a backup plan. Airbnb on the other hand, involves an economic transaction and the shared resource is clearly a commodity that the company substantially profits from. Their policies involve cancellation rights and fees, and the company reports to the IRS, the tax agency of the United States. These policies have consequences for both hosts and guests.

This service may also have the potential—particularly in popular tourist cities—to turn large parts of the city into a distributed hotel. This might bring economic benefits to neighbourhoods outside of the traditional tourist centres, but it may also produce an imbalance between residents who take an active ownership of their environment, and visitors who may not. According to [Slate.com](#), the service may even drive up housing prices or take out as much as 20 percent of the housing stock.

These examples bring up an important discussion about ownership and perceptions of the sharing economy. In what situations is a commons-approach that focuses on mutual human relations the most apt model, and when is the idea of organising it as a commercial service valid? How can we give participants ownership over their shared resources? And can we incorporate aspects in the design that may promote a sense of shared ownership and responsibility, even if the service is promoted as a commercial one? This, along with the previously discussed trends (and of course others that could be part of this debate), remain a cornerstone for the urban interaction design research agenda of the coming future.

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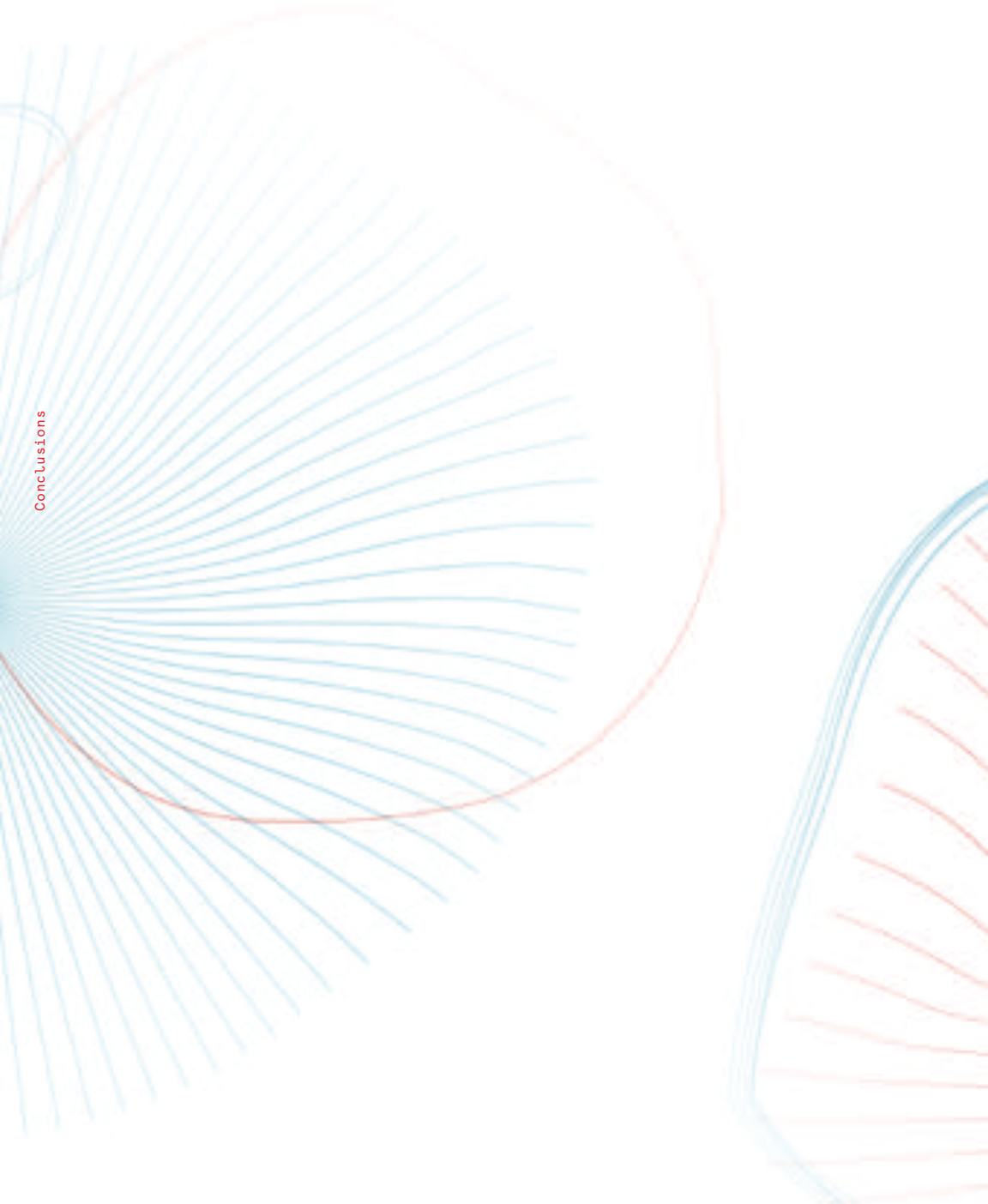
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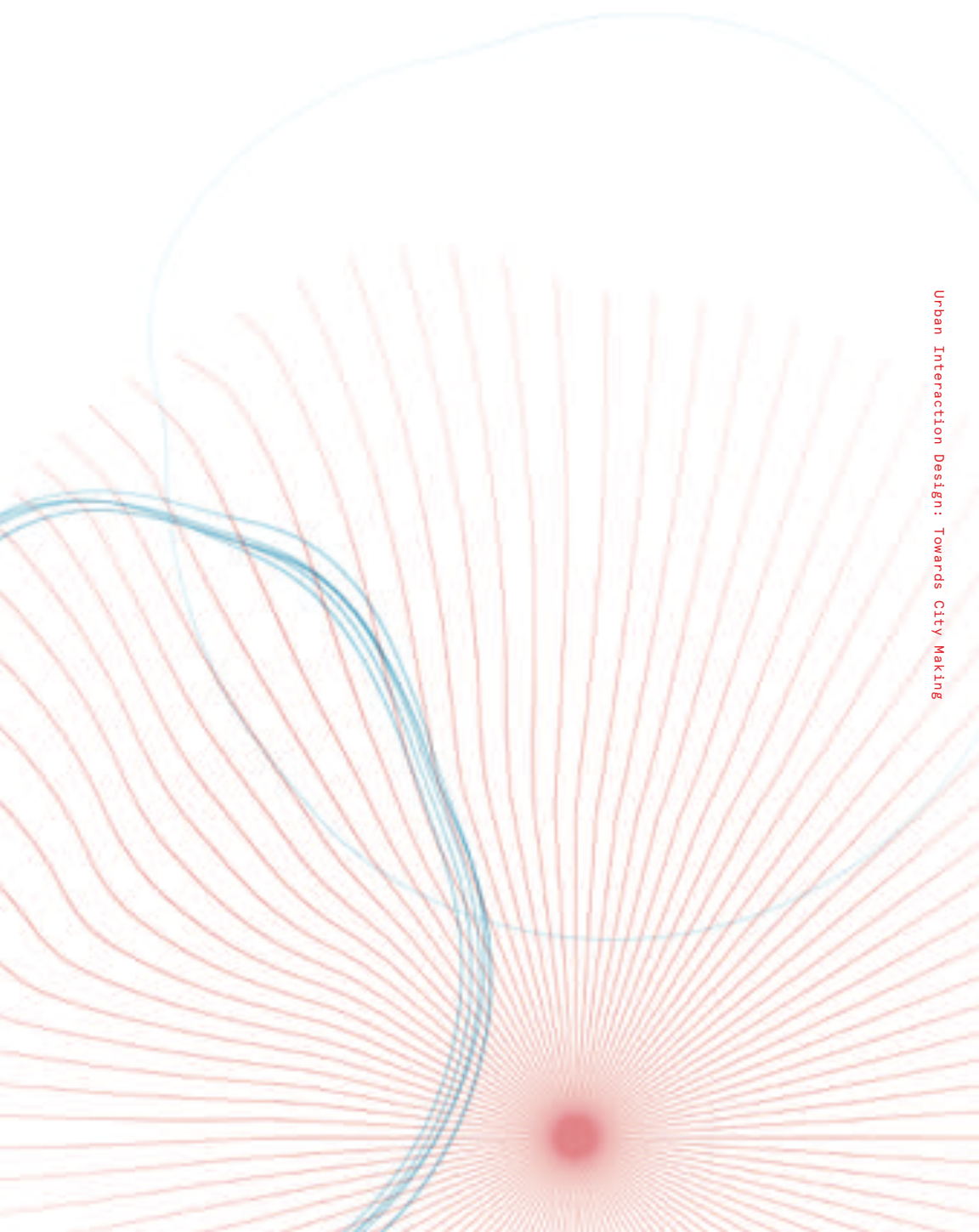
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Conclusions





Conclusions

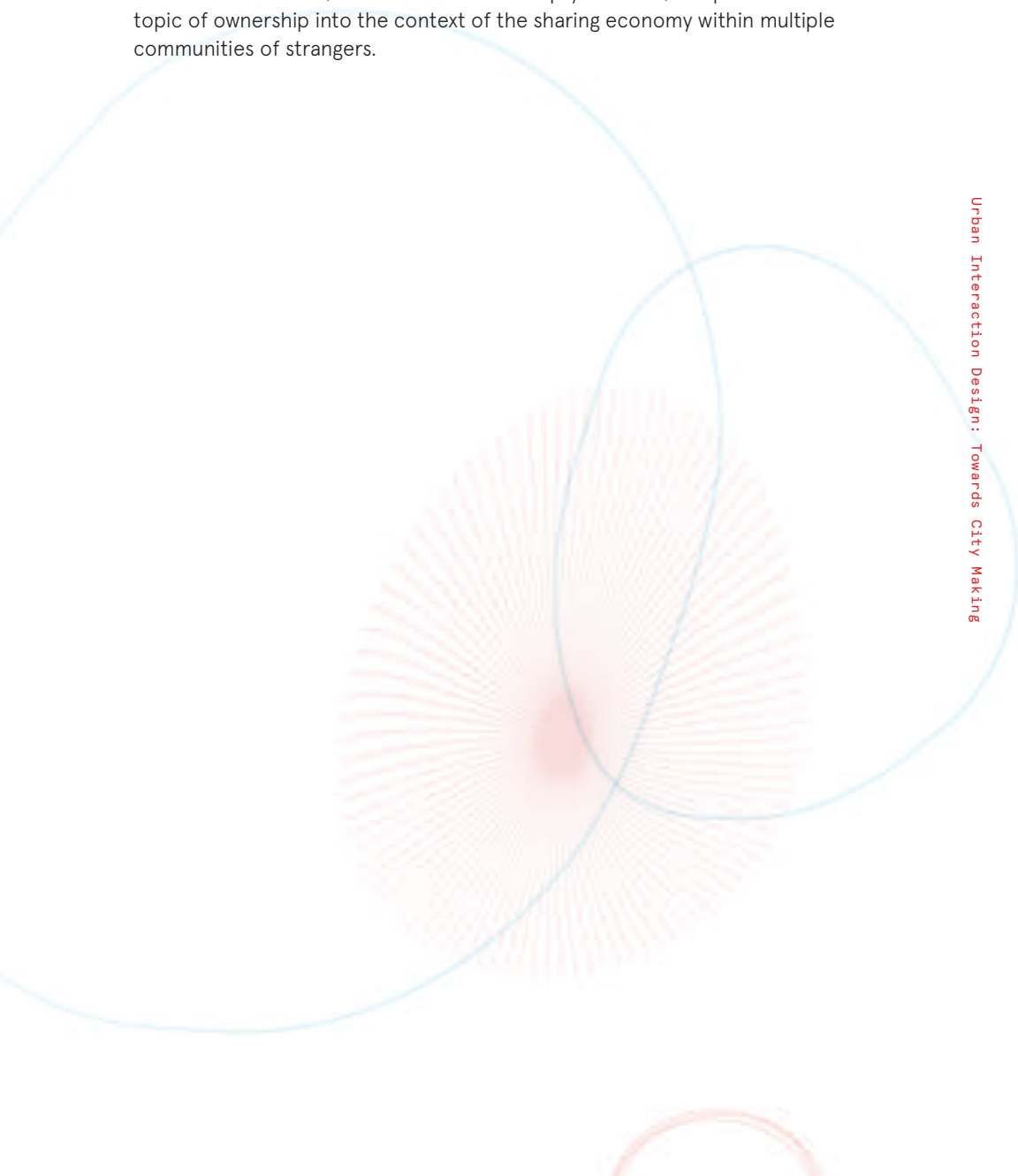
Urban interaction design demands that we emphasise the DIY impact of city making. This is clearly illustrated by events and movements emerging in networked activism and informal communities, and begs the question: can everybody be a city maker? An increasingly important role of the urban interaction designer can be to facilitate publics to participate in city-making processes by providing and developing useful tools for citizen-centred city making.

Contrasting this bottom-up movement, another trend starts to emerge from some of the challenges classical city-making institutions are facing: they need to have both internal and external cross-sector borders as well as look for co-creative partnerships. What contribution can an urban interaction designer make in reframing city-making institutions? How can urban interaction designers help in the articulation of institutions' tasks and citizens' needs? Urban interaction design is moving into this role in order to help bridge the gap between different sectors and disciplines as well as between institutional interfaces. The design of things and systems can mediate this.

This leads us to thinking about a perspective of reciprocity between the many services, products and platforms within the networked city. The basic premise is that everything is being mixed and reappropriated which affects the way we approach city making. Here we expect urban interaction design to be able to map, navigate and critically explore the rationales and tensions created in the gaps between the socio-technical elements of the urban stack and in the life between the systems. The many vignettes and examples that we draw from in this text present a range of possible tensions and controversies that propagate throughout the networked city and challenge practice even more as things become increasingly interdependent and interconnected throughout the city.

Furthermore, sharing tools for sharing addresses mapping techniques as common ground for the fields that come together in this emerging discipline. In urban settings, maps can turn representations of space upside down, or enforce established relationships of power. By using urban interaction design as a way to articulate multiple scales and modalities, maps can be used to connect personal activity to collective action, private scales to global ones. Moving forward, the different layers of the city are constantly being reordered through networked mapping approaches, media, sound, and technical and other mediated layers that interface with the physical realm. Urban interaction design can explore how the multiple layers that pile up in urban space are challenged at multiple scales, articulating and injecting personal experiences into the established set of interactions in the city.

Lastly, this text has explored the concept of ownership and how it changes in the networked city. The implicit consequences of the datafication of urban situations and the interactions across the social layer of the city must be addressed in regards to ownership and its relation to the spheres of the commons, civic economy and privatisation. This challenges how we understand ownership in relation to who can use, who owns and who has the right to use data generated in the city. Datafication and the possibilities of managing numerous resources, from vacant lots to empty couches, has pushed the topic of ownership into the context of the sharing economy within multiple communities of strangers.



Why Urban Interaction Design Matters

- The making of our cities is a concern for all of us, not just for city governments.
- Institutions need to cross-sectoral borders and look creatively for partnerships.
- One man's product is another man's platform.
- Maps are political tools for inclusion and exclusion, and make power structures visible.
- Ownership over data is closely linked to being in control of identity.
- Making liveable cities starts by taking a human-centred perspective.
- Sharing is more than commercial exchanges in a market.
- There are more ways to understand ownership than simply the right to exclude.
- Networked city making offers common ground for fields to come together.
- We want cities that are hackable.
- We need to go beyond antagonistic bottom-up versus top-down paradigms and encourage integrated systems.
- We need more than locked-in, path-dependent, grand technological systems.
- We need information that is actionable rather than prescribed.
- Active citizens can benefit by having tools with which to influence policy.

- Removing barriers can drive social change.
- We are looking for ways to create value.
- We can make the invisible tangible.

Urban interaction design matters as we move towards city making, because we want to make interesting, desirable, inclusive, and safe cities for people to live, flourish, and take pride in.



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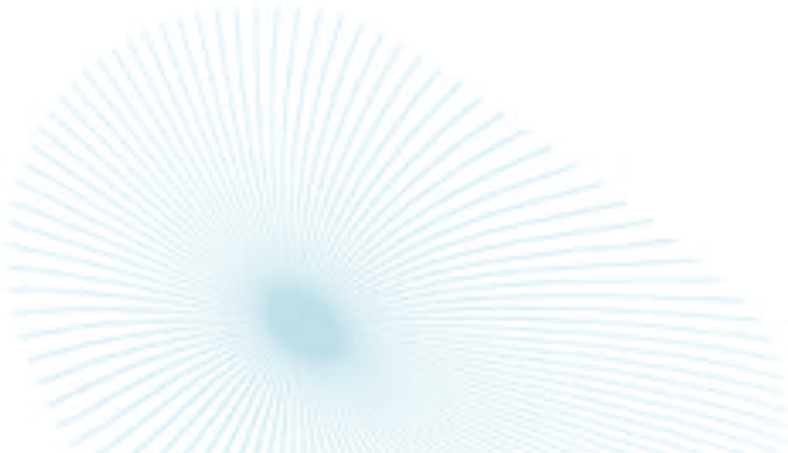
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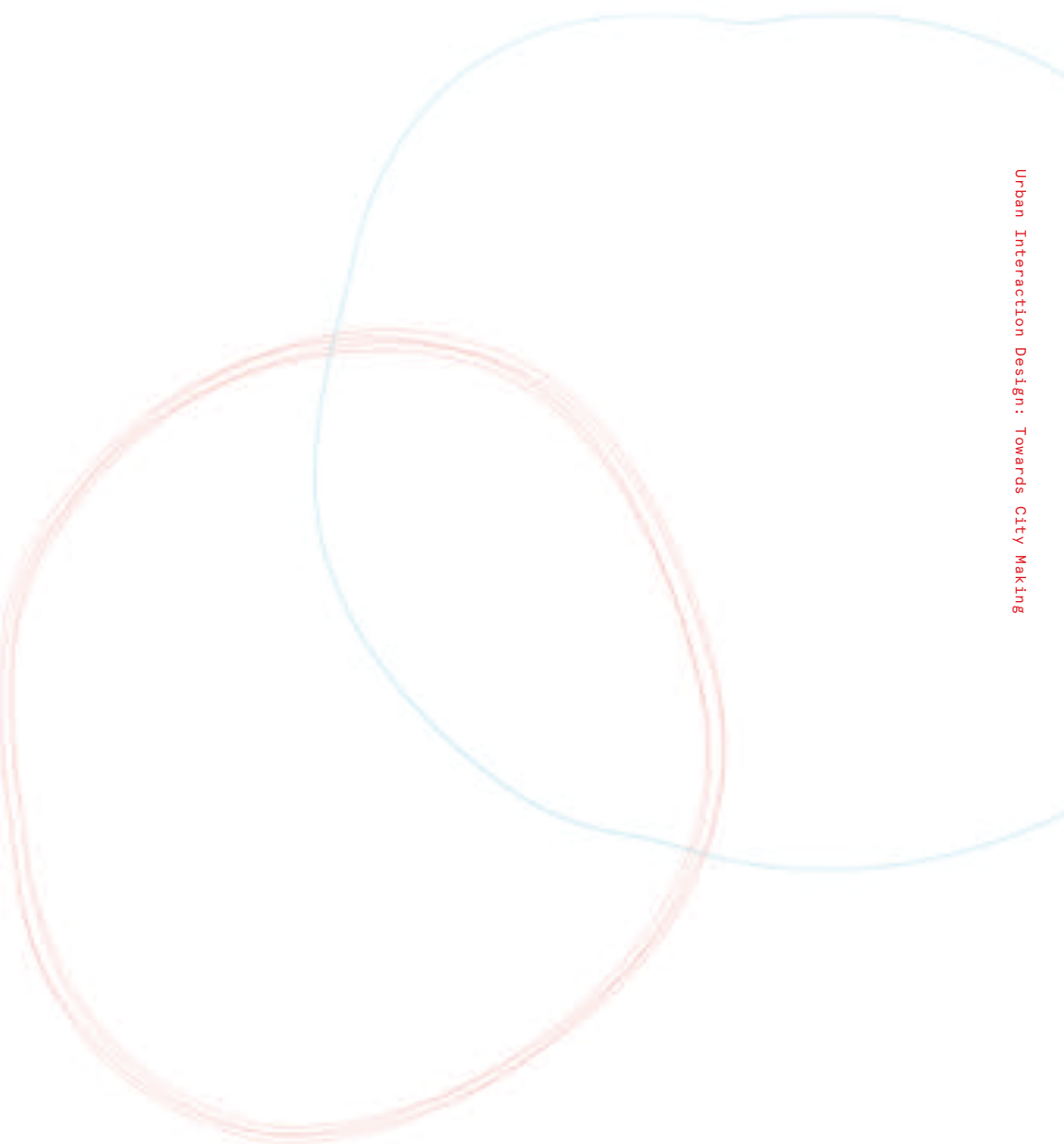
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