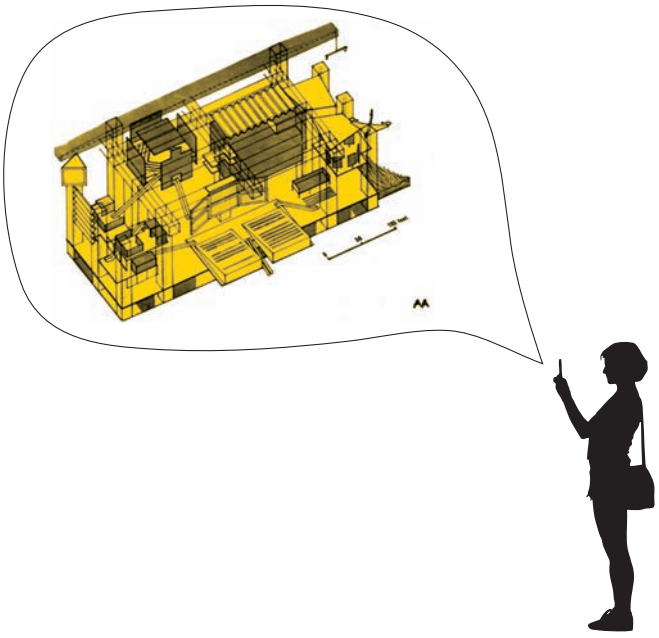
The ubiquitous palace

Analyzing urban pervasive games as an interface for a new Public Realm



By Aris Kafantaris / supervisor Kuma Kengo
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Analyzing urban pervasive games as an interface for a new Public Realm

by

ARIS KAFANTARIS

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Abstract

The aim of this paper is to showcase how pervasive games can positively affect engagement with the public space in the context of a highly mobile and networked urban society. Cities are becoming vast fields of data expression and circulation; at the same time anthropological research shows that our perception of physical space and sense of presence change because of mobile technologies. An ever-increasing proliferation of mobile media means that fundamental components of public life are no longer expressed in a physical space. Under these circumstances, how does one understand urban public space and can it still be a platform for meaningful social interaction? A possible answer would come from a special case of urban media: pervasive games, i.e. games that have no clear-cut spatial, temporal and social limits. They play out in the urban environment, run on parallel with everyday activities and blur the distinction between participants and audience. Because of that, pervasive –meaning pervading, spread throughout– games display a series of disruptive characteristics that allow us to conceive and design space in terms of dynamics between the users, as opposed to functionality, materiality and morphology, which are usually the foci of architecture. In order to study these dynamics and understand the content of urban space in terms of social relations, this thesis examines Lyn Lofland's concept of 'realms', which are territories defined by social relations. This will give us a common framework to understand the social content of both: physical public space and media space. After we understand content, we need a framework in order to understand interaction. That framework is Martijn de Waal's theory of 'City as Interface'. By viewing urban environments as interfaces, it is possible to analyse the structure of information exchange and the social dynamics involved. More importantly, we can directly compare physical architecture and media systems, as urban interfaces. Finally, after content and interaction we want to address purpose. How can one deal with he ethical and political implications of modifying social territories? In order to do that, we need a valid architectural precedent to measure our results against. That precedent is offered by Cedric Price's Fun Palace: a game like environment inside a mobile building, which would change in response to visitors' patterns of use. The main part of this thesis is the analysis of six case studies of pervasive games, according to de Waal's interface theory. Through the analysis, we see how these games can alter social realms in physical public space. After the analysis, they are compared to the Fun Palace in terms of function, scope and ideology. Through the comparison, it is possible to draw conclusions as to how we can use pervasive games to design new urban spaces and a new public realm.

Preface

In an article on Seoul, journalist Anthony Townsend describes how the mobile phone is a great match for life in an Asian Metropolis: "The challenge of living in a large Asian metropolis is eased through the convenience and flexibility provided by mobile phones. … [it] provides a way of organizing a modern life across the many public and private rooms – for moving, working, eating, playing, and resting"[1]. I first read Townsend's observation after having lived for a few months in Tokyo and it resonated with me despite the fact that it was written about Seoul. Since then almost two years passed, which I mostly spent as a graduate student in the Japanese capital. Tokyo surprised me on many levels; be it the scale and complexity of the metropolitan area, the ubiquitous transportation network, the labyrinthine extensions of hub stations over and underground into commercial complexes or the packed density of neighbourhoods forgotten from the Taisho era. My gradual conversion into a 'networked individual' happened rather seamlessly, but at a certain point it was obvious that I had turned into what Townsend described; someone who could not live without the convenience of the smartphone. What really surprised me was not so much my acquired dependence on the device, but that I was using it in ways fundamentally different than I used to back home[2] –where it simply served the purpose of a portable telephone and messaging device. In Tokyo, I had started experiencing the city on equal measure through the screen and through my own senses; the smartphone became a mediator between the city and myself, rendering the city incomplete and –most importantly– incomprehensible without it. Navigating Tokyo's thirteen metro lines and fifteen rail lines feels akin to teleporting; I always follow the optimal route by a transport app, calculated among dozens of possibilities. Untangling the consistently irregular street patterns above ground while searching for a restaurant buried in the third basement floor of a department store linked to a transportation hub is equally impossible without a GPS-linked map; not to mention finding the same place twice or deciphering a sign written in calligraphic Kanji[4]. But social life in Tokyo is also inextricably connected to the smartphone; social media have turned into my fine-tuned and personalized news centre; keeping in continuous and uninterrupted contact with flat mates, the lab and several groups of friends, I am inadvertently broadcasting my life and at the same time planning it according to my social network's broadcasts. These are but a few personal experiences, that in no case cover the extent in which mobile media is changing urban life. However, they did rouse my curiosity enough to set off my initial exploration on the ways that social media materialize in public space; that gradually evolved into the current research, especially after coming into contact with the work of Cedric Price. As architects we are trained in shaping objects and dealing with space in a factual –sometimes tangentially philosophical– way, but any notion of the city feels incomplete without an understanding of its media component.

Chapter 1

Introduction

Shaping buildings following unseen parameters and conversely giving shape to the intangible has always been part of the architectural discourse in varying degrees. Religious architecture, throughout the world's cultures, offers copious examples of metaphysical spaces: from the cruciform plans of Byzantine churches to the Mecca-oriented Minbar [5] in Islamic mosques and the hallucinogen-enhanced underground labyrinth of the Necromanteion[6]. Then of course, we have political qualities finding expression through the built form. These range from the looming palaces cementing the Emperor's absolute power in ancient China to the English romantic garden standing as a manifesto for bourgeois emancipation, and the numerous cases of architectural "revivals" where certain styles were dragged from the backlogs of history to express their owners' political standing. In all these cases we see the conscious effort to produce something physical and tangible by tapping into something intangible. In other words, constructing a media-based architecture; a cyclical process where the building is the embodiment of information and the information makes the building.

Throughout the historical examples of media architectures a limiting common denominator is visible; media follow patterns of change much faster than brick and mortar and, therefore, the association would always suffer from a time lag. This double life of architecture started becoming increasingly prominent in the 1960s, intensified by the ubiquity of advertising and the media revolution brought upon by the TV. Philosopher Jean Baudrillard introduced the concept of Simulacra to describe a reality artificially constructed through media over-saturation while, at the same time, the Situationists tried to re-connect themselves to the physical space of the city through experimental performances. It was at that time too that the mutability of media invaded the world of avant-garde architecture and found expression in the work of Nieuwenhuys, Archigram and, most importantly, Cedric Price.

In today's cities, however, the question of the relation between media and architecture has turned from a mainly philosophical into a rather practical one. Cities are getting increasingly complicated; to manage them we need to control the constantly shifting data streams that underlie most urban functions from traffic control to energy distribution and garbage collection per household. Cities lead a dual life as physical spaces and as information spaces; almost the same can be said of city dwellers, whose social life is increasingly migrating out of urban space and into the cloud of mobile social networks. Finding a way to reconcile the media sphere with physical urban space is no longer an avant-garde exercise; it is a necessity for anyone aspiring to design socially relevant public space.

Admittedly there is a lot of ongoing research in the field of urban informatics, which studies how information flows within a city, what sort of new urban services it allows and what patterns of urban life it generates. A large part of it is focused on the role of urban media –from public touchscreens to mobile apps– and how they can create meaningful interfaces between the user and the city. However, if one looks back to the roots of media applications in architecture – found in the 1960s– there is one particular component missing from today's urban interfaces: fun. Not meaning the safe, sanitized fun of mall shopping, but rather the disruptive fun of urban play that can generate social interaction and – most importantly– locate that interaction back into physical space.

Throughout urban media, one can identify interactive artworks or social media platforms that include mechanics of play to increase user involvement and encourage participation; these mechanics are often called 'gamification' when used in the context of corporate productivity[7]. Especially in 'gamified' applications, play is used only tangentially or instrumentally. However, an untapped potential for urban interaction lies in a more obscure brand of urban media that interweaves play and everyday life: pervasive[8] games. Pervasive games are a very new form of urban media, which break the spatial, temporal and social barriers of traditional play as defined by anthropologist Johan Huizinga. Pervasive games use the city as a playground, have no specific time limits and blur separations between players and observers. So far, their potential to affect urban space and function as active components in an architectural context has not been adequately studied . This thesis examines the use of pervasive games as an urban interface and proposes directions for their future incorporation into wider design practices.

Statement of the Problem

Before we begin to study any effect of pervasive games in physical urban space, certain hurdles need to be overcome. How can we study pervasive games in a way relevant to urban design, given that they have no material components or build structure? Pervasive games –like most games– are linked to physical space in two obvious ways: they sometimes have physical components, and they take place in a designated physical space. Unlike disciplines related to the build environment however, they are not intended either as space design tools or space defining tools. Game theorist Montola writes that:

> "As with all game design, pervasive game design is second-order design: The designer does not design play but the structures, rules, and artifacts that help bring it about"[9]

Therefore, a theory is needed that can offer insights into the spatial aspects of media and how they work as systems; pervasive games can then be approached within that framework. On a second level, in order to study pervasive games as

facilitators of public space, we must find a way to discuss mediated and physical spaces from the user standpoint; in other words, we need a framework of interaction that can deal with both media and architecture in an urban context. Lastly –since this is empirical research–, a precedent is needed in order to define an ideological framework or standpoint through which games can create a public sphere: an architectural precedent is ideal. With these three areas covered and the appropriate research language found, we will examine through a series of case studies how pervasive games can enhance public space and generate a public realm.

A question of content: Physical Space versus Information Space

Cities have changed a lot in the last couple of decades: not so much in form but mainly in content. The physical elements are all still there and perfectly recognizable: streets, squares, buildings and infrastructure. What is new, at least in implementation if not in concept, is the data sphere defining the function of major cities today. The physical space of the city is saturated with sensor networks; the flow of information from and to the network might not be readily visible, but it comprises the nervous system of contemporary metropolises, without which they would not be able to function. Public life in the city happens within a context of continuous information exchange and most city dwellers are involved in it, consciously or not; the pending question is whether public urban space has any role to play in this exchange. Critic Jane Jacobs famously wrote that "word does not move around where public characters and sidewalk life are lacking"[10]. But owing to mobile media, word does go around without the need for physical space. That is why in order to study pervasive games as part of the urban interactive media ecosystem, we need a framework that can describe the sort of virtual –but very real in their consequences and functions– spaces generated by media; a system that will describe space in terms of information exchange. In a word, we need to understand the social content of urban space, be it a physical or a mediated one.

A question of interaction: Framework for user interaction

Even if we find the proper language to describe the common content between physical and mediated or augmented space, we still lack a theory that will allow us to understand user behavior in them –this is especially important in the case of pervasive games, which are by definition a framework of interaction. Pervasive games work in a way similar to contemporary urban subcultures; for example, cosplayers in Harajuku express themselves both on a specific sidewalk and in their Facebook page where they upload and comment on pictures. Their identity, their interaction and the space where it takes place lie both on the physical and media spheres; there is an overlay a layer of data on physical space and certain interplay between the two and the users. Therefore, one needs to find a way to describe these interactions within the same framework, i.e. who sets the rules, the

subject of exchange, why does one system work and another does not etc. According to anthropologist Kennichi Fujimoto, our very perception of presence in physical space is shaped by mobile media, which act as "territory machines"[11]. As designers, we lack a framework for studying interaction across media and urban structures where a Facebook page and a sidewalk can be compared under the same terms. If the previous research question is about function and content, this one is about interaction and interrelation.

A question of purpose: Architectural precedents

Finding a –preferably realized– precedent of media architecture where space is defined by game-like mechanics is crucial, since it will permit us to understand the scope of such an endeavor. Neither public space nor the act of designing it is neutral and devoid of social and political orientation. An urban designer takes a stand every time they introduce a change in public space since that change will directly affect urban dwellers' lifestyles. In the case of pervasive games, there is a perceivable lack of an agenda; after all, as anthropologist Johan Huizinga put it, play in all its manifestations "Is an activity connected with no material interest, and no profit can be gained by it."[12]. The study of an existing 'architecture of play' will allow us to understand the social implications of playing in –or with– public space from a designer's perspective. After we understand the social function of pervasive games and the way in which they stimulate interaction between users and the urban environment, we only have to identify the purpose. This is not a purpose inherent in games, since it is linked to user agency; it can become embedded during a conscious design process. However, the very nature of playful activity in urban space has certain implications, which can be better studied by examining a valid precedent.

Background and need for the research

A very short overview of the recent evolution of mediated space will help framing the research presented in this thesis. The study of interaction between media and the build environment dates more than half a century back; urban life was becoming saturated with visual information on an unprecedented scale. The 'Situationist International' group of philosophers and thinkers was born within this context as a critique of late capitalism, of which a primary concern was the increasing mediation of social relations through objects. During their early years they developed a fierce critique of mainstream urbanism and introduced the concept of Psychogeography: an approach to geography that emphasizes playfulness and 'drifting' around urban environments. Their thinking affected both social sciences of the time and the orientation of cutting-edge architecture and urbanism. Several of the ideas discussed in this thesis date back to the sociopolitical context of Europe in the 1960s and 1970s. An important part of the discourse of the era also stemmed from the capabilities of emerging technologies. Ivan Sutherland created the first computer display and interactive

CAD software in 1962[13]; it was received as tangible proof that a computer could express information spatially. Soon, the notion that information can be treated as a 'place' inspired the creation of the MIT Media Lab by Nicholas Negroponte in the late 1970s. The discourse around media architecture moved towards symbolism in the '80s when it was incorporated into the postmodernist agenda and was picked up again in the early 1990s when researchers like Greg Lynn popularized the concept of form as a product of animating forces –mechanical, programmatic or even cultural. Of course the range of architects and thinkers who drove the research is too long to even briefly summarize here; but at every point, realized design applications were driving existing information technologies to their limits. This became more prominent in the last two decades when technological experimentation took precedence over a philosophical stand towards architectures of information; 'virtual reality' fell out of fashion as fast as it had come in vogue and the focus shifted into 'augmented reality' i.e. the overlap of digital and physical spaces. Pervasive games enter the discourse relatively late; the first genuinely pervasive game dates back to the '70s but the vast majority was born out of the introduction of mobile Internet. Interest in the field has been rekindled since 2012 when Google decided to push with the implementation of a cheap, commercially viable Augmented Reality interface. Information space and physical space are converging even on a perceptual level. Therefore, the study of the social and spatial implications of pervasive gaming comes as a continuation in the lineage of the media architecture discourse that started in the 1960s. The field is very young and the majority of pervasive games have only been experimental projects or hardcore activities for small and dedicated audiences. However, this is changing; a handful of successful pervasive games in the last decade reached audiences of millions[14] and the trend is rising. Driven by cheaper interfaces and an increasing adoption of mobile Internet, pervasive games have the potential to become a major influence on how we use urban public space. So far, there has been no dedicated study dealing with the urban implications of pervasive games and this thesis is an attempt to work in that direction.

Lyn Lofland's Social Realms as shared content between Information Space and Physical Space.

Pervasive games operate simultaneously in physical and mediated space. When an important part of urban activity is taking place partially or exclusively in a media sphere, it would be helpful to seek a frame of reference in urban anthropology. It should be notes that most research in this field coincided with the explosion in media studies in the 1960s. Like architecture, urban anthropology deals with space but it focuses on the more fluid and vague area of Social Space; Lyn Lofland refers to the constituents of social space as 'realms' [15] and her classifications form the backbone of the discourse in this thesis. Realms are social territories[16]; they are defined by the type of human behavior and by the protocols of information exchange that dominate said behavior. By looking at both Urban

Space and Urban Media as social territories, their shared content becomes clear. While Social realms have no visual bounds it is usually possible to circumscribe them by studying people in a particular location or context; needless to say, realms quite often they overlap and intermingle. Lofland argues that the dichotomy between private and Public is not enough to explain the intricacies and political undertones of the ways that people organize themselves in cities, and therefore introduced a third term, the parochial realm[17]. Since user interaction lies at the core of any game, examining pervasive games as generators of realms instead of physical space –which can only be generated by the physical act of building– can provide insights on their role in the urban media ecosystem.

Martijn de Waal's Interface as a framework for interaction

The ideal way to understand the function of pervasive urban games is by studying their effect on social realms; but in order to understand how city dwellers can continually shift their attention from the physical to the media environment, a theory of interaction is needed. That theory must work on both physical and mediated constructs. Sociologist Manuel Castells notes, that "Cities have always been communication systems, based on the interface between individual and communal identities and shared social representations"[18]. In other words, the city's material structure is a crystallized form of an underlying constant process of translation and communication from individual to communal identity and back. This view treats the whole city as an interface and completely sidesteps the apparent dissonance between the media and physical environments. One researcher who has studied this relationship in depth is Martijn de Waal, who builds a comprehensive spatial interface theory, showcasing at the same time that cities have always worked as interfaces in a series of case studies. De Waal's system is ideal for studying pervasive games since our case studies shift from physical landscapes to mediated architecture and to pure media constructs. By interpreting urban pervasive games as interfaces we can understand their effect on the city and the way they produce new interactions between the players and physical space.

Cedric Price's Fun Palace as an ideological precedent to pervasive games

When we try to look for an architectural precedent that operates outside what traditionally qualifies as architecture, i.e. for pervasive games, it is necessary to set certain criteria. For this thesis, the architectural precedent should:

a) Treat media as a constituent component, not an afterthought
b) Deal with the mechanics and social implications of play
c) Be realised, completely or partially

Unsurprisingly, almost all candidates date back to the 1960s; as it was highlighted before, that was one of the most productive decades in experimental architecture within the context of new media. We will only mention here in the introduction artist Constant Nieuwenhuys' 'New Babylon', a theoretical labyrinthine city shifting constantly according to the users' manipulations and Archigram's 'Plug-in city', an urban typology where the city is treated as an event, to which the material constituents are circumstantial. However, we will focus on Cedric Price's 'Fun Palace', an urban educational playground whose program would be generated by the users' behavioral patterns. At this point, one major limitation of this research becomes apparent: the most relevant architectural precedents were never realized –they remained experiments, ink on paper and scale models. However –and this is why this research focuses on it– Cedric Price's Fun Palace came exceptionally close to the point of being realized. It had reached the design level of a comprehensive proposal –with structural analysis, programmatic planning and an extremely detailed outline of its punch card Operating System– when it became apparent that political complications would not allow for its completion. What is more, Price did manage to build a couple of smaller projects that iterated on the ideas of the Fun Palace; therefore it is by far the closest we can get to a functional, realized architectural precedent that can be compared in scope and function with urban pervasive games of today. The comparison will highlight the ideological constituents of these endeavors; it will address questions over the control of data flows and user profiling, the agency over the rules of interaction and the positively disruptive attributes of Play.

Purpose of the Study

The purpose of this study is to apply Martijn de Waal's theory of Urban Interfaces on a selection of Pervasive Games, in order to explore whether and how these games infuse social life into the physical public space. Pervasive games are a very young branch of urban media and have been inadequately studied, especially from the standpoint of urban design. Placed within the discourse of 'smart cities', understanding of pervasive games can offer valuable insights into the role of the user –and the meaning of physical public space– in a data-driven urban environment. Martijn de Waal offers a overview of various urban media as interfaces and examines how they affect urban life; however, pervasive games are conspicuously absent despite the fact that de Waal's framework is ideal for their study. De Waal's five interface elements of 'Platform', 'Program', 'Protocol', 'Filter' and 'Agency' will be used as analytical tools to six pervasive games in order to evaluate them as urban interfaces, understand their intrinsic differences and similarities and extrapolate design strategies. The criteria for choosing these case studies were two: a variety of 'external references' that the games use to conceptually bridge the gap between the physical and the media layers and a minimum degree of 'pervasiveness'. Pervasiveness was judged on three levels –spatial, temporal and social– according to the work of game theorists Montola, Stenros and Waern.[19] Finally, Cedric Price's Fun Palace is used as a 'control case'

to further understand the philosophical and ethical implications of data-driven design and urban play both in a historical –1960s London– and in a contemporary context.

Research Questions

1. Under what circumstances can pervasive games work as effective urban interfaces?
2. How is the idea of disruptive play –relevant and politicised in the 1960s– introduced into today's 'smart cities' by pervasive games?
3. What is the relevance of leisure in the context of an information-driven urban environment?

Significance to the Field

As technology becomes increasingly mobile and interfaces pervasive, space itself is becoming a field of expression of data. The concept of Virtual Reality has slowly slipped into the realm of entertainment while Augmented Reality interfaces promise to infuse our everyday experience of the city with multiple layers of extra information, overlaid upon physical space. To create architecture within this context, one needs to think in terms of system design; and games are a system by definition. Examples of architectural research into games are however scarce; this thesis aspires to operate within that gap. There is also an added element of technological urgency: most of the successful applications of pervasive games have so far been in the field of advertising; however, this trend seems to change as mobile Internet and AR technologies are becoming widely accessible. Google is going to provide their Maps API to third party developers from 2015. This is expected to kick-start an unprecedented period of experimentation and production in the field of pervasive gaming. This is an opportune moment to explore the implications of pervasive gaming in the urban environment and extrapolate strategies that can be applied in the design of relevant urban architecture.

Definitions

Domains: Domains are used to refer to social territories, but the term only comes up in certain quotations and is not used in the thesis. 'Realms' is used in this thesis instead.

Experience Marker: A medium that is used to record an experience, tie it to a place and share it with others. For example, various functionalities of Facebook and Twitter work as experience markers. Other examples include traditional blogs and geo-tagged photos.

Gameplay: Gameplay is the specific way in which players interact with a game and is used mostly in the context of video games. Gameplay is the pattern defined through the game rules or, alternatively, the space of possible affordances.

Interface: An interface is the place at which independent and often unrelated systems meet and act on or communicate with each other.[20] Mostly used in the context of computer science and programming.

Keitai: 携帯電話 or Japanese style mobile phones that kicked off a 'keitai culture' in the early 2000s by predating current smartphones in many of their features and succeeding in mass adoption and usage.

Locative media: Media that is location-specific. Usually used by artists and in contrast to 'location-based services', which denotes commercial applications

Ludic: Relating to, or characterized by play. From Latin 'ludus'. Related terms are 'ludology', i.e. the study of games and 'illusion', i.e. deceit or something non-real.

Magic Circle: The magic circle is a concept by anthropologist Johan Huizinga that describes the self-enclosed and alternative reality of play.

Operating system or OS: The software that supports a computer's basic functions, such as scheduling tasks and controlling peripherals. It is also the framework on which other, more specialised software runs.

Pervasive games: According to Montola et al. they are games that break Huizinga's 'magic circle' in one of three ways: spatial, temporal or social, i.e. games in which there is ambiguity as to their duration, playing area and the identity of the participants. They do not have to include any digital components.

Parochial realm: It exists when the dominating relational form found in some physical space is communal, i.e. one's classroom.

Private realm: It exists when the dominating relational form found in some physical space is intimate, i.e. one's home.

Public realm: "It exists when the dominating relational form found in some physical space is stranger or categorical"[21], i.e. a central urban plaza.

Public sphere: The Public and parochial realms together consist the public sphere, i.e. social interaction that does not happen behind closed doors but in Public Urban Space.

Territory Device: "An appliance or system that can influence the experience of an urban area"[22]. A territory device works on a perceptual level; it changes one's understanding of space.

Ubiquitous computing: Ubiquitous computing is a concept in computer science and software engineering where computing devices are made to appear everywhere and anywhere.

Ubiquitous games: Often used interchangeably with 'pervasive games', it mostly refers to games played on a mobile platform such as a smartphone; given that the device employs geo-location services. The term is closely related to the notion of 'ubiquitous computing'.

Urban media: "technologies that in one way or another can influence the experience of a physical location"[23]. Urban media can be seen as a generalization of the concept of 'territory device'; a territory device works on a personal level while urban media can be extended systems or frameworks.

Limitations

This study's major limitation stems from the current state of pervasive gaming; it is a young and ill-defined field where scholars cannot even agree on using the same terms[24]. Therefore there is certain ambiguity as to what constitutes a pervasive game; I use the 'magic circle expansion' definition by Montola et al (Pervasive Games, design and practice. 10) . Another issue is the currently small number of produced games since many have only existed as experimental prototypes. The six games chosen for this study represent different facets and implementations of pervasive gaming, but future researchers could use a larger sample size for further insight into the subject. Due to the factors already mentioned, I am positive that within the next couple of years the genre[25] will witness an explosion and many more examples will be available for study.

The second limitation that I need to address is the fact that many of the useful conclusions as to the ethical and philosophical considerations of interactive design come from a comparison to the Fun Palace – a project that in the end remained unrealized. This is countermanded by the fact that the conclusions derived from said comparison are mostly related to design intention, which we can clearly perceive from existing documentation even though the Fun Palace was never realized. Closing Chapter one, the following diagram is a graphic representation of the research methodology followed in this thesis.

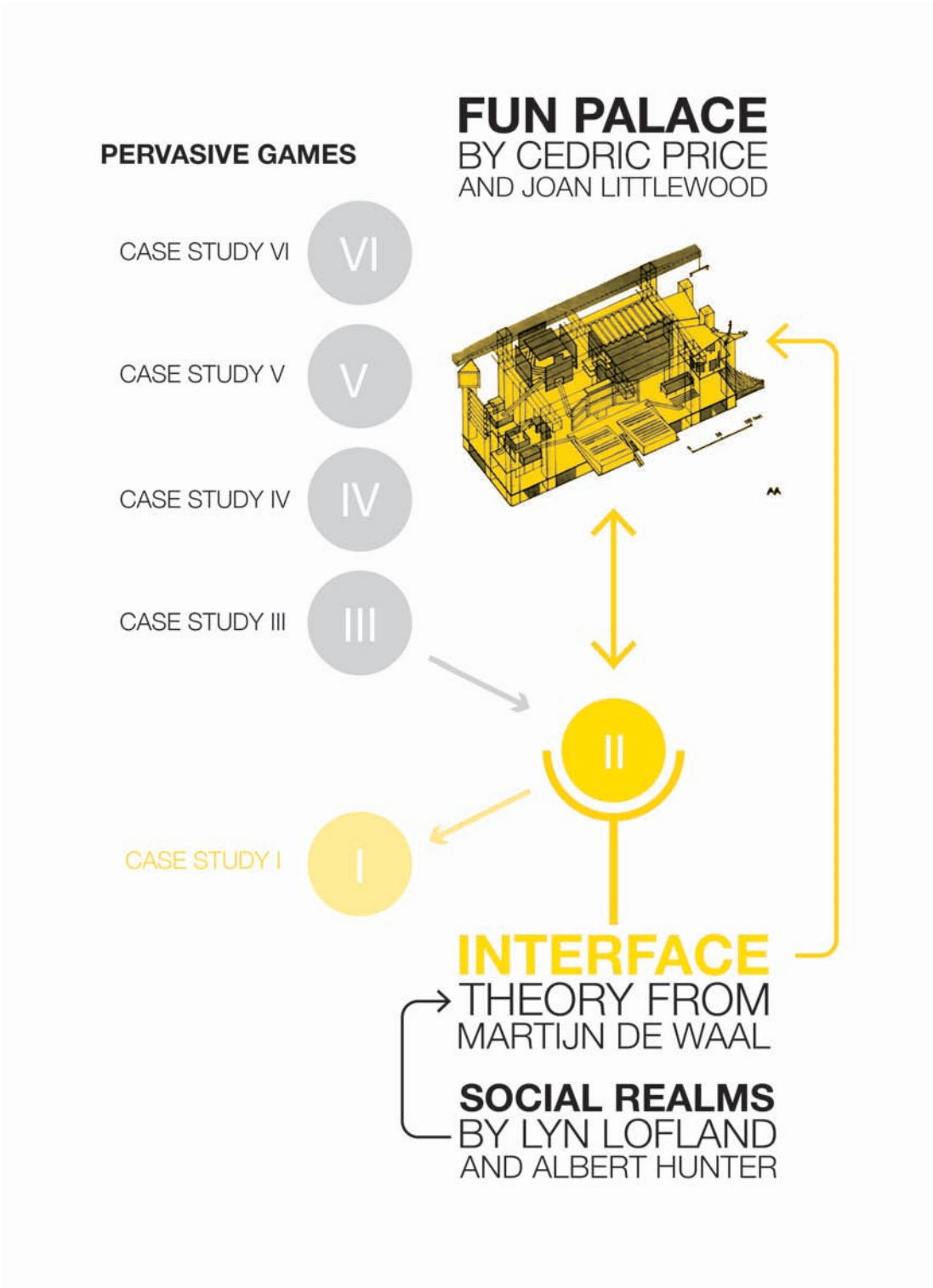

Figure 1 Diagrammatic exposition of the Thesis methodology

Chapter 2

The two basic theories underlying this thesis will be presented in this chapter. As we saw earlier, the aim is to evaluate pervasive games as participatory systems that create or affect social space and how that has an effect on physical urban space. We start with the context of the research; what makes pervasive games and urban media in general relevant in contemporary urban discourse? Our cities are turning into data-driven urban environments and, at the same time, city dwellers' perception is changing through the use of mobile communication and media. In order to understand these shifting environments, we will focus on the concept of social realms and their expression within public space, both historically and in the context of contemporary media. This will offer us a better understanding of the way media are changing the way we socialize in cities. Subsequently, we will present Martijn de Waal's Interface theory as a means to evaluate the spatial function of physical structures, urban media and, of course, pervasive games. The last part of chapter two offers a historical context for pervasive games; Cedric Price's Fun Palace, which we will be better equipped to understand through the theories of Lofland and de Waal.

Context: Smart cities and networked individuals

The city as an expression of Data

Cities are not what they used to be. This simple statement will of course sound trite and commonplace but it is meant as an ontological statement. Cities are, literally, not made of the same components that they were made of in the past; public life in the city happens within a context of continuous information exchange and most city dwellers are involved in it, consciously or not. Two examples of contemporary metropolises are telling; while the first one was retrofitted, the second one was designed with information management as its core guiding principle.

In Rio de Janeiro, the aforementioned reality has manifested itself into a –now famous and widely publicized– control centre. It is reminiscent of NASA's headquarters, and also named accordingly: Mission Control[26]. Equipped and maintained by IBM, the centre aggregates and visualizes data from 30 agencies[27], helping the city coordinate their work in real time. Everything, from traffic data and power grid usage to reports and recordings of riots or natural disasters is filtered through the centre, which in turn mobilizes the city's departments and informs the public through various social networks. Rio de Janeiro's Mission Control is testament to a new urban paradigm where a computing analogy is perfectly in order: if the physical city is the hardware, its data control centres are the operating system. Rio was retrofitted with its control centre in order to bring existing data feeds together and integrate them in one system, but new cities are

increasingly designed from scratch with data collection and management capabilities.

Songdo in South Korea is often presented as the poster child for the new age of 'smart cities'. Cisco, who competes in the nascent playing field of urban informatics against IBM and Microsoft, was responsible for the integrated information technology of the project. On Cisco's website one reads the promotional quote: "Built from the ground up on reclaimed land near the Yellow Sea, the $35-billion-dollar Songdo project is a model for smart cities around the globe."[28] In Songdo, not only is the occupancy of parking spots, the production of garbage and the use of utilities centrally monitored, but the system also identifies individual users and their daily life patterns. The garbage collection department knows exactly how much trash is produced by a specific individual, since bins are operated by personal electronic keys. Electricity consumption patterns are similarly monitored on a household basis. The promise of Songdo is to create a convenient, efficient and safe urban environment without the messiness and wasted energy of traditional brick and mortar cities. On a second level, mirroring developments in the field of customized advertising, pioneered by Google and Amazon, the smart city scenario promises to offer personalized services, attuned to the individual user's preferences and life style. Data pooled from all sources possible –from one's supermarket point card to their Twitter feed– can fine-tune the services on offer.

Consumer profiling as a technique dates back to the 1960s, but our data-collecting capacity, as well as the variety of the sources and our data cross-linking capabilities have increased exponentially since those times. The scenario of the city as a service that removes the hurdle of choice and provides the user-consumer with unprecedented convenience sounds at the same time exhilarating and worrisome; probably indicative of the fact the IT companies are increasingly involved in urban design. According to urbanist and researcher Adam Greenfield, "It is sort of unprecedented that a fairly major discourse in urbanism is authored by private enterprises"[29]. The eventual commodification of the full spectrum of our urban activities is not as distant a reality as it might sound. Wherever one walks, makes a phone call, uploads a picture or shops at a department store, a ceaseless exchange of data takes place as the city senses and quantifies the daily fluctuation of life. But unlike the example of Songdo this process is increasingly decentralized and distributed; most of the countless sensors that have colonized our urban environment do not belong to any single authority. Nevertheless, they are getting increasingly connected to the 'internet of things'; a worldwide web where not only people but also objects, from weather stations to electronic coffee pots and anti-theft systems and, ceaselessly exchange information. Anthony Townsend does the math for us:

> "Today, there are at least two additional things connected to the Internet for every human being's personal device. But by 2020 we will be

> hopelessly outnumbered –some 50 billion networked objects will prowl the reaches of cyberspace"[30]

That might on the one hand mean a move towards an open-source handling of all that data where they would be accessible and usable by anyone. After all, it makes sense for data generated in public space to be classified as a common good that is free of private ownership, just like certain wireless frequencies are[31]. However, several alternative approaches are also possible. Data has a price and major businesses are built on their handling and distribution. Feedback loops are being created as commercial apps offer their data to city administrators in exchange for civic data that would help them run their apps more smoothly, as the example of Waze and Moovit in Rio shows[32]. Users reporting on traffic through these crowd sourced platforms not only inform other users but also the city Mission Control, which in turn improves its real-time traffic management and feeds the information back to the public.

The main consequence of this model of city management is that, remarkably, the main data-transmitting sensors are the city dwellers themselves. The proliferation of global mobile connectivity is astounding: about seven billion mobile subscriptions and over two billion mobile broadband connections, with most of them in the developing world[33]. Almost one third of the global population is wirelessly connected to the internet at all times –most of them through smartphones– talking, uploading pictures, tweeting, checking the weather, paying their bills, finding parking spots or playing a casual game. Cities are becoming vast fields collection and expression of data, especially when it comes to Public Spaces where the density of people –and devices– increases. Yet, this torrent of activity is seemingly disconnected from physical public space, despite the fact that it is a vital part of urban life.

Trying to reverse this trend on the last decade, an increasing number of artists are experimenting with visualizing data flows in meaningful ways. The field of interactive urban art has gained a lot of momentum, with several genre-specific art festivals hosted in urban centres around the world. Not to mention that contextualizing information in space is also a lucrative business and the primary focus of several commercial apps, such as Google Maps, LayAR and Foursquare. Ubiquitous games –which are the focal point of this research– also work on the same premise; creating a parallel space by manifesting location specific information. The common denominator between the aforementioned examples is that they are all what Martijn de Waal defines as urban media: "technologies that in one way or another can influence the experience of a physical location".[34] Therefore, a parallel shift is happening: cities become increasingly 'smart', but due to the proliferation of urban media, city dwellers' perception of physical space is shifting as well.

ITU Statistics (http://www.itu.int/ict/statistics)
Global ICT developments, 2001-2014

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014*
Mobile-cellular telephone subscriptions	15.5	18.4	22.2	27.3	33.9	41.7	50.6	59.7	68.0	76.6	83.8	88.1	93.1	95.5
Individuals using the Internet	8.0	10.7	12.3	14.1	15.8	17.6	20.6	23.1	25.6	29.4	32.5	35.5	37.9	40.4
Fixed-telephone subscriptions	16.6	17.2	17.8	18.7	19.1	19.2	18.8	18.5	18.4	17.8	17.2	16.7	16.2	15.8
Active mobile-broadband subscriptions							4.0	6.3	9.0	11.5	16.7	21.7	26.7	32.0
Fixed (wired)-broadband subscriptions	0.6	1.0	1.6	2.4	3.4	4.3	5.2	6.1	6.9	7.6	8.4	9.0	9.4	9.8

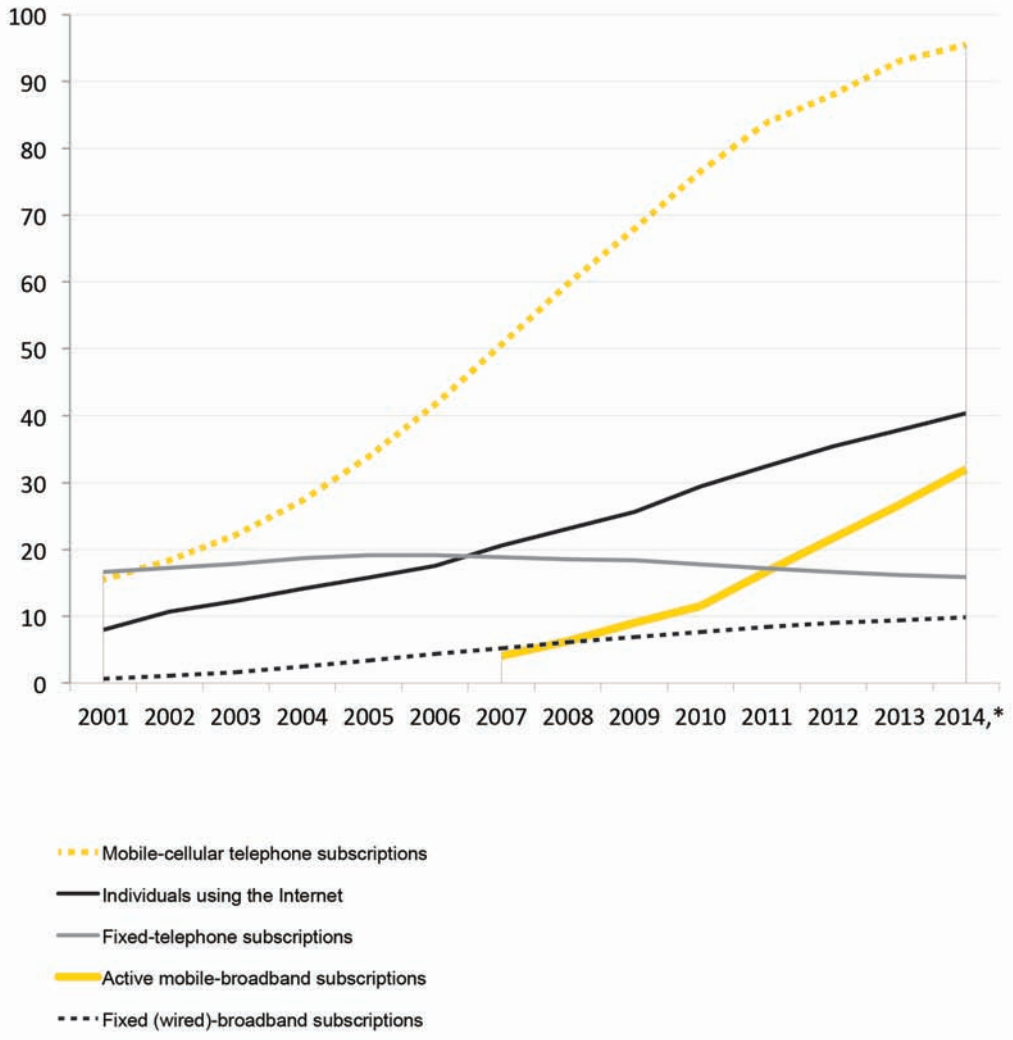

Figure 2 Global Internet and mobile usage statistics as of 2014. Source: ITU

The mobile phone as a territory device and a new concept of presence

The first signs of a profound perceptual change of space in the newer generation of interconnected city-dwellers were observed in Tokyo in the early '00s. According to Howard Rheingold, the main catalyst for that was the introduction of the first commercially successful mobile Internet service in the world, i.e. NTT

Docomo's 'i-mode'. As Rheingold points out however, mobile internet did not materialize out of thin air in Japan; the user base of mobile phone subscribers was already one of the most robust in the world even before i-mode, and the distinctively style high-tech Japanese style mobile phones known as 'keitai' had created a whole new youth culture based on messaging. Therefore, mobile connectivity greatly enhanced a phenomenon that Japanese anthropologists were already observing in the texting habits of Tokyoite teens. Kenichi Fujimoto, in a study of mobile phone use by teenagers in Japan, describes the mobile phone –or keitai– as a:

> "jamming machine that instantly creates a territory – a personal keitai space – around oneself with an invisible minimal barricade. With a keitai a girl can turn any space into her own room and personal paradise."[35]

Keitai evolved into something far more important than a telephone with wireless coverage. It became a territory device, generating an invisible but perceivable bubble of personal space. This emergent attribute of keitai as territory devices is explained by Rheingold as a disruptive phenomenon that happens when two unrelated major technologies meet and merge; in this case, it was mobile telephony and broadband internet connectivity that particularly affected the way in which young urbanites meet and seek entertainment in urban space. Physical hangouts, where one would drop by hoping to bump into friends and acquaintances have all but disappeared. We carry our personal circle of acquaintances with them at all times and physical presence is no longer a requirement for a shared experience in the city. This viewpoint is shared by anthropologist Mizuko Ito, who in a conversation with Rheingold explained,

> "as long as people participated in the shared communications of the group, they seemed to be considered by others to be present"[37]

A technology that changes the concept of presence is bound to have profound spatial implications; especially in the way people meet and interact in physical public space. As we will note in the next sub-chapter, the use of the mobile phone creates an immediate private sphere around the user and transports them from a public to a private realm. That helps explain the hostility with which talking on the phone in public is met: it really is an intimate invasion on the neutral ground of public space, akin to someone undressing or relieving themselves. When one talks on the phone in a public space, an inherent contradiction becomes obvious since the subject must decide which realm's rules to follow; the intimate ones of the phone conversation or the social facade of the public realm.

From territory devices to experience markers

The inclusion of the Internet into this private bubble that city dwellers carry with them has brought certain changes. Unlike talking on the phone, as long as one is texting or browsing silently through a screen, the invasion of intimacy is not acknowledged. Almost everyone in a packed metro car in downtown Tokyo is absorbed into a smartphone without infringing on each other's personal territory. The link up between mobile devices and the Internet brought about two further unexpected side effects; it gave birth to distributed locative media and paved the way for the use of the phone as an 'experience marker'. An experience marker is any medium that is used to record urban experiences and share them with others. As the user puts together his personalized urban experience, it is not only broadcast in social media but it also leaves invisible marks in real space as most of the information generated is geo-tagged. A huge collage that one is able to search and assemble on demand creates a second incarnation of the city in the media sphere. The city leads a double life and so do its inhabitants. W.J. Mitchell, already before the age of twitter, Facebook and Foursquare check-ins, wrote in his book 'Me++':

> "Multiplying thousands of electronic eyes and ears continuously capture the city's unfolding interwoven narrative threads and spin them out into cyberspace. Some of these threads are ephemeral and disappear instantly. Others sit on voicemail, email and other servers for a while, then are deleted or automatically fade away. Yet others accumulate permanently to form and an expanding, long-term memory trace"[38]

That image is fed back into physical space in the form of peoples' expectations that were built through online mirroring. This 'doubling' of meaning through media is not something entirely new and had concerned a number of writers from Debord and his 'Society of the spectacle' to Baudrillard and the idea of Simulacra. With locative media, however, there is an undeniable consistency in this system of representation. Information about the self and the city is generated and expressed attached to location. Urban media is changing our sense of location as much as it does with our sense of presence. So, to point back to the opening question in the introduction: how does one make sense of urban space when an important part of urban activity is taking place partially or exclusively in a media sphere? Like architecture, urban anthropology deals with space but it focuses on social space or realms.

Public Space and the Public Sphere: Lyn Lofland's realms

Realms are social territories; they are defined by the type of human behavior and by the protocols of information exchange that dominate said behavior. By looking at both physical space and the media layer that overlaps with it as social territories, urban research can overcome mock dichotomies like 'real versus virtual', which for Interaction artist Osman Haque "is now as quaint as the 19th

century's distinction between 'mind' and 'body'".[39] While realms have no visual bounds it is usually possible to circumscribe them by studying people in a particular location or context; needless to say, realms quite often overlap and intermingle. Most importantly, as anthropologist Lyn Lofland stresses:

> "realms are not geographically or physically rooted pieces of space. [...] Whether any actual physical space contains a realm at all and, if it does, whether that realm is private, is parochial or is public, is not the consequence of some immutable culturally or legally given designation [...] a personal residence, if it is empty of human beings, contains no realm"[40]

This is why in the 'Statement of the Problem' part of the thesis we designated social realms as the social content of urban space; realms are territories generated by human interaction, be it in a physical or in a mediated space. Lyn Lofland describes three types of social space, or realms; she also stresses that cities are unique in that they are the only form of human settlement where all three realms exist at the same time. This sub-chapter will take a closer look at Lofland's definitions and then apply them through de Waal's theory of Urban Interfaces to understand the social and spatial qualities of pervasive games.

The private realm

The private realm is the world of the household and friend and kin networks and according to Lofland it "exists when the dominating relational form found in some physical space is intimate".[41] This thesis will not focus so much on the private realm since we are mainly concerned with interaction between different users of urban space; which happen within the context of the public sphere. However, it must be noted that the private realm is the most 'mobile' of the three social territories. It is a projection of the self and since pre-industrial communities, as long as they were travelling in small groups, people have been carrying their private realms with them: in their carriages, their tents, their suitcases etc. As long as there is intimacy, private realm 'bubbles' can be built; up until recently more than one person was needed for that, but as we glimpsed in the previous chapter, mobile media allow for the first time, a single person to carry their own private realm bubble with them. Furthermore, the private realm is culturally relative and also carries gradations of acceptable behavior, layered within each other. One is expected to act differently in one's bedroom, at a close family dinner or when having coffee with a good friend. Lofland argues that the distinction between private and Public is not enough to explain the intricacies and political undertones of the ways that people organize themselves in cities, and therefore introduces a third term adapted from the work of Albert Hunter[42], the parochial realm.

The parochial realm

The parochial realm exists "when the dominating relational form found in some physical space is communal"[43]. The word 'parochial' originally referred to anything relating to a local church parish and also carries a negative connotation; someone who is characterized as such is supposedly having a limited or narrow outlook or scope. According to Lofland, the parochial realm is

> "characterized by a sense of commonality among acquaintances and neighbours who are involved in interpersonal networks that are located within 'communities'"[44]

The workplace and the classroom are typical parochial realms. The neighborhood is usually presented as an example of a communal social territory but that description is problematic; it really depends on the historical and social context, as there is nothing inherent in the features of physical space to make it parochial or public. Furthermore, parochial realms can be highly contextual; a certain person's parochial realm may be another's public realm. These nuances will be better explained in the next subchapter. A general observation is that parochial realms in public space tend to be shaped by subcultures. The particular spot where teenagers cosplay every Sunday in Harajuku constitutes their parochial realm; the same is true for a Turkish cafe in Shinjuku that is frequented by immigrants from Anatolia. The members of those communities recognize each other as part of the same social group and they appropriate a public space which becomes 'their' parochial realm.

The public realm

Lofland takes extra care to draw the distinguishing line between public space and the public realm. The public realm exists "when the dominating relational form found in some physical space is stranger or categorical"[45]; in other words is the world of strangers and the street. That does not mean that people do not recognize each other; they do. The terms of recognition however are not on a personal level; rather, they are classifications, e.g. 'the bus driver', 'a policeman', 'a Republican', 'a student' etc. The public realm is where one confronts the unknown and shapes one's individual identity. The parochial and the public realms together form the public sphere, where human interaction happens in the open, in physical –until recently– public space. Out of the three, the Public realm is the most ideologically charged one and the most difficult to accurately describe; it is tied to political context. Lofland stresses that the public realm is a product of the modern city. In pre-industrial urban settlements there was no such thing as a public realm; in all but the largest imperial capitals, human communities shared a common history and kinship. Pre-industrial urban environments were mostly communal, parochial realms. That is what makes the public ream, in Lofland's words "The city's quintessential social territory".[46]

An overview of the Public Sphere

The public sphere has traditionally been expressed in physical space, but does not necessarily coincide with it anymore; moreover, it tends to shift according to social circumstances. A public square is not necessarily a public realm if no meaningful exchange between strangers takes place i.e. if it is occupied by a particular subculture that drives other users away, it is converted into their parochial realm. Similarly a house is not a private realm if the occupants are knowingly under surveillance, which would make them change their behavior accordingly. But first and foremost, social realms are entities shaped and manifested through modes of human communication, which in turn means that: the expression of the public sphere in urban space is indicative of the political and social forces underlying the city. That is precisely why their attributes have been described differently depending on the time and political disposition of the thinkers discussing them. As de Waal points out, for philosophers Hannah Arendt and Jürgen Habermas, the public realm is a podium for rational discourse on which the political and social life of the city is founded; it is

> "primarily a neutral meeting place where the city dwellers shed their individual identities and meet as citizens in order to enter into discussions with each other on the basis of rational argument"[47]

A further typical example of how various thinkers have dealt with the public realm is the concept of neighborhood in the 20th century. An idealized conception of the neighborhood appeared in Europe in post World War II planning, as urban planners struggled to create cohesive communities. As we discussed, in rural settlements there is no public realm, since everyone knows each other and all exchange between them happens in a context of familiarity and trust. The village is essentially one parochial realm. On the contrary, the public realm is born in urban environments where a daily confrontation with the stranger takes place and this mostly happened in the industrial and post-industrial city. Several communitarian neighborhood plans were applied where the aim was to connect the neighborhood into a parochial realm. In contrast to communitarian ideals, for Jane Jacobs writing about Greenwich Village in '50s New York, the street was supposed to be the place where urban publics developed on the neighborhood level, not by forming a closely-knit village-like community, but by forming a "web of public respect and trust" through repeated everyday interaction and mutual recognition. Jacobs said of the sidewalk small talk that "Most of it is ostensibly and utterly trivial but the sum is not trivial at all".[48] Therefore, she rather sees the neighborhood as a public realm that is shaped by a minimum level of mutual trust. Admittedly, sidewalk talk does not comprise an important part of social life on a neighborhood level anymore; and it has been so for several decades. On the antipode of both trails of thought stands S. Groemann to whom the neighborhood is a purely neutral public realm that

does not even form a basis of discourse; it is redundant. In a 1971 article for Intermediair he wrote that to the modern urban dweller:

> "The surroundings are an 'ethereal zone' to him. He uses it only instrumentally, passing through it in his car without knowing it. Only a much greater whole takes shape for him, but only in outline".[49]

For Groemann, the main generative force for this social condition was the introduction of the television, which made the everyday person feel part of a much wider mediated urban public realm thus pushing the notion of any social life in the neighborhood into oblivion. It is noteworthy that the media –in the guise of radio and television– and transportation –mainly in the guise of the automobile– is already appearing in 1971 as a force that is changing the way that social realms manifest in cities, but it will become even more evident in the next example.

The public sphere and new media in the city

In 1998 Arnold Reijndorp writes of the 'network city' that: "This [network city] is much less the result of urban planning than of government and market strategies [...] The network city provides a differentiated supply of housing environments, places of employment, education and training, and of cultural, recreational, services and institutions. The inhabitant of the network city compiles his or her own 'package' from this supply".[50] In what looks like a 'cut and paste' urbanism, the neighborhood is yet another piece connected in the tangled network of parochial realms that consist the city dweller's sphere of social life. The emergence of mass media and transportation has enlarged the city dweller's world, so that he is now involved in a larger social unit. The city dweller turns into a 'networked individual' and he finds communal expression where and when he chooses to, thanks to his high mobility.

> "His city consists of an extensive network of parochial domains [...] it is debatable whether there is still a clear-cut public domain, a place where all city dwellers meet"[51]

This is not in small part due to new media. Especially the proliferation of mobile Internet has intensified this process and re-arranged all three social realms within the context of urban space. We already saw how the mobile phone operates as a territory device, allowing individuals to carry a bubble of private realm with them in public space. The public sphere was equally –and perhaps more– affected. Urban subcultures have found one extra platform of expression in social media, and they use them in conjunction with physical public space; communities are more spread out in the city since they can move with ease from one hangout to the next, be it a physical or the digital one. The communal sphere where people identify members of their social groups is expressed perhaps more in Facebook pages and twitter feeds than in actual streets and squares. At the same time, the

public realm is lacking definition; but this point will be addressed in chapter three, in parallel with the analysis of pervasive games in urban space. Two useful conclusions can be drawn from this overview. Firstly, the concept of social realms can further the understanding of the common content between physical and mediated space. Secondly, there is an important difference between the public realm and the parochial realm: the first one is politically charged; the literature on what the public realm 'should be' is just as rich as the one addressing what it 'is'. The parochial realm on the other hand has a more stable definition and it is flexible enough that it can withstand fragmentation and still work as a social territory. Subsequently, we will address the effect of urban media on the public sphere by applying Lofland's terms within the context of de Waal's theory of the City as an Interface.

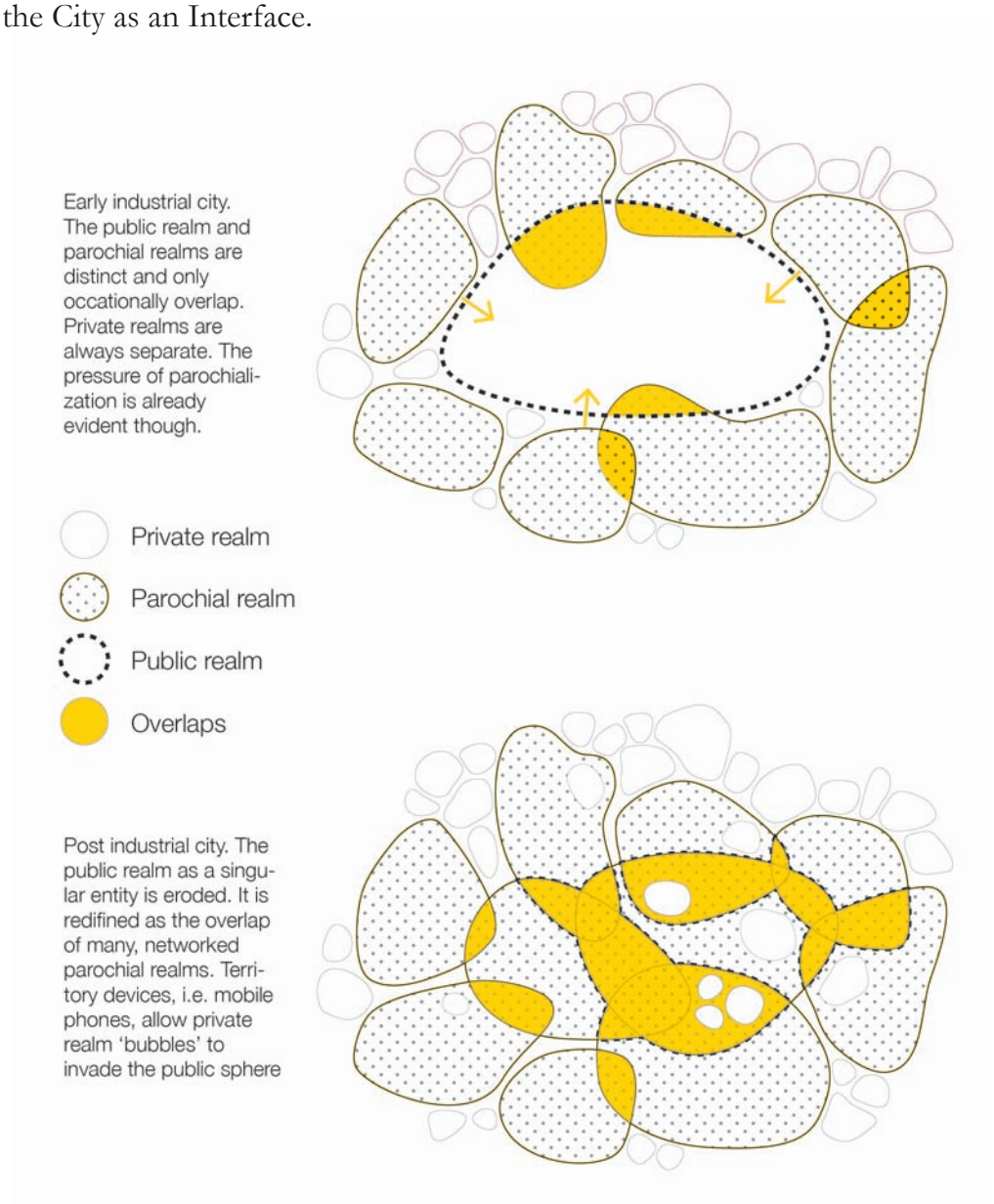

Figure 3 The early industrial city versus the 'network city'. The public realm is now formed by overlapping, networked parochial realms

Martijn de Waal's City as Interface

Martijn de Waal's research describes a common framework to understand the interactions that take place in urban social territories; as we already saw, urban space leads a sort of dual existence as a physical and as an information layer. Social territories or realms infuse both aspects with content, but that does not mean that there is a separate third, social layer. Rather, there is a social component in both the physical and the mediated urban space, which creates link between the two. For a telling example we can evoke a street in Harajuku:

The physical part of this urban space is comprised of the street, the sidewalk with its various extensions and nooks, the shops, the offices etc. The mediated street is probably too complex, fluid and interconnected to fully identify here, but we can approximate it: it is the street on Google maps with all the meta-information such as 'street view', public transportation data, shop reviews etc.; the uploaded geo-located pictures that users took on street level; the tweets that come up in a search when one searches for #Harajuku that describe this street and its surroundings; blog posts about the street and its shops; the shops' webpages; the various shoppers', cosplayers and musicians' groups on Facebook where they upload videos from the street and comment on them; the augmented game layer on which gamers play pervasive games like Ingress,; the cloud of users of proximity-dating app Tinder who happen to be nearby and are matched to each other. The list can go on and, furthermore, there are many interconnections between the examples mentioned. Expanding on that picture, the parochial realm of a group of shoppers crowding in a clothes store is extended to those from the group who could not join physically; they can access the realm by commenting in real time at their friends' pictures. A public realm is also forming somewhere between the tweets and the tree-lined Omotesando Douri, where strangers acknowledge and mentally categorize each other; in Twitter, there might even be some debate between involved individuals.

Social territories are defined in both the physical and the mediated space; but there is no way to compare them side-by-side. Social realms allow us a glimpse into the content but not into the function of such a complicated system. This is the gap that Martijn de Waal's theory is covering. De Waal goes on to prove that urban public spaces have always functioned as interfaces; when we view them as such the process of communication and interaction between the individual and the public sphere, as well as the role of physical and mediated space in this interaction, are both clarified.

What is an interface

The definition of the word interface is "The place at which independent and often unrelated systems meet and act on or communicate with each other e.g. the man-machine interface".[52] Interface is

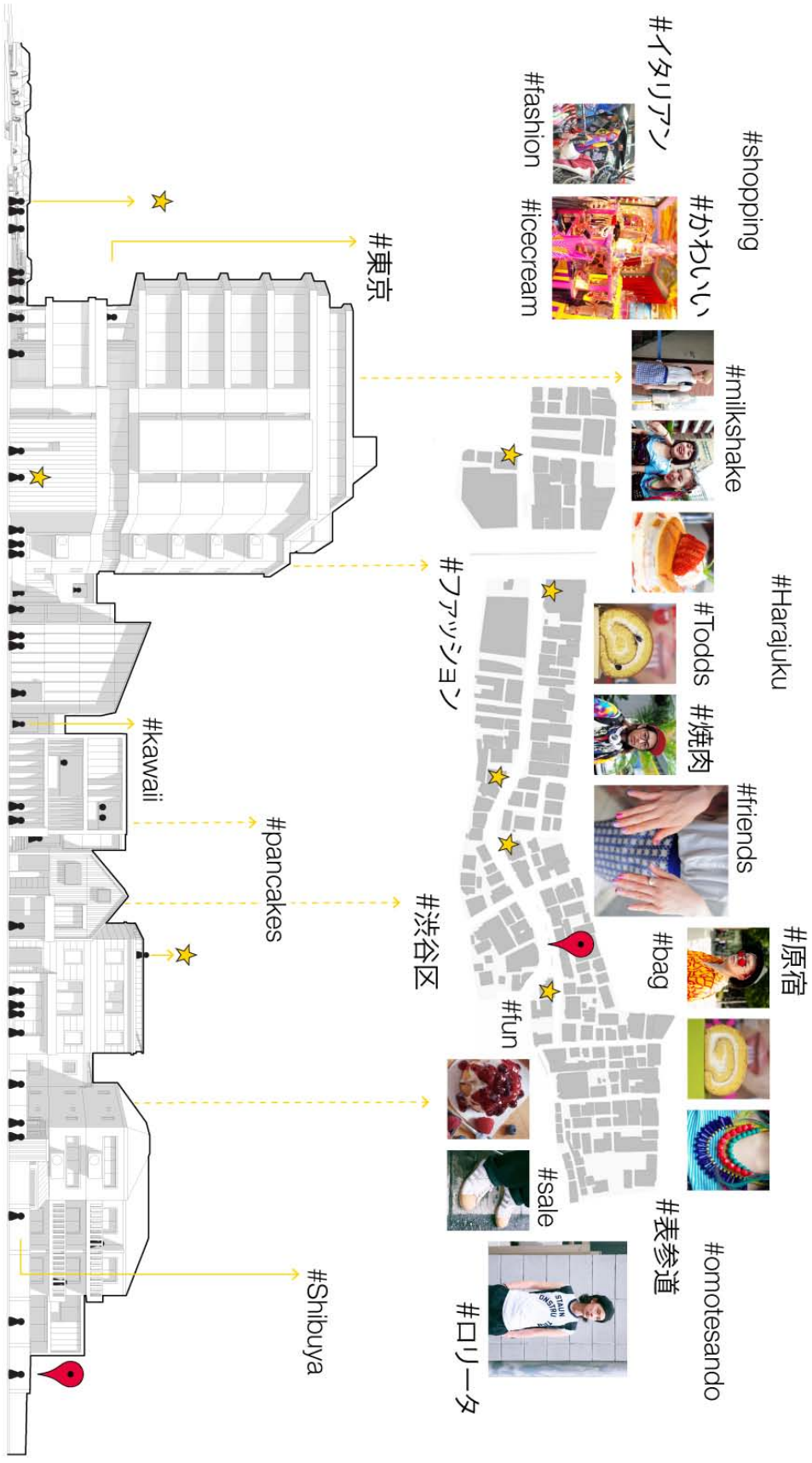

Figure 4 The 'double' life of a street in Omotesando; physical and media layers.

interestingly defined as a 'place'. When one considers the history of graphical user interfaces this makes perfect sense; GUIs were conceived as an 'information space' at a time when interaction with software happened through keywords typed in command lines. That is why the word interface is still mainly associated with software design, evoking images of screens, cursors and icons. Graphic interface design was a media revolution in itself in the late 1960s but this thesis will focus on the concept itself that predates GUIs and which can be applied to contexts that predate the twentieth century.

The defining attribute of an interface is that it regulates interaction between systems. Moreover, it has recursive capabilities; an interface can be made out of sub-interfaces. The application of this generic concept is wide and fascinating; an interface can be a piece of software handling communication between different pieces of software, in which case it is called an API[53]. It can also be a mechanical contraption that allows a person to manipulate an object, like a door handle or a dial for a pressure valve. In this context 'interface' is also coupled with the concept of 'affordance', i.e. the possibility of some form of action and the successful implication of that action[54]. Lastly, an interface can even be a person; the ones handling communication between mortals and the divine for example, were known as oracles. But how does that relate to the city and the urban space?

The city as a spatial interface

The term 'interface' and its connotation of information mediation has proven useful in a variety of research fields unrelated to computer science. Sociologist Manuel Castells notes that:

> "Cities have always been communication systems, based on the interface between individual and communal identities and shared social representations. It is their ability to organize this interface materially in forms, in rhythms, in collective experience and communicable perception that makes cities producers of sociability, and integrators of otherwise destructive creativity"[55]

In other words, the city's material structure is a crystallized form of an underlying constant process of translation and communication, from the individual identity to the communal and back. Or –if we want to speak of social territories– the city and its individual components function as interfaces between the private, the parochial and the public realm. One researcher who has studied this relationship in depth is Martijn de Waal, who builds a comprehensive spatial interface theory, showcasing at the same time that cities have always worked as interfaces in a series of case studies (City as Interface).

Martin de Waal's five elements of the interface: Platform, Program, Protocol, Filter and Agency

De Waal works in different scales from the neighborhood to the metropolitan area, but one thing that stands out in his methodology is that interfaces are presented as a recursive concept. Namely, interfaces can be nested into each other in multiple levels in a way that is compatible to Christopher Alexander's notion of a system as a kit of parts. Therefore, the porch, the street, the neighborhood, the city and the social networks in which its inhabitants participate are nested interfaces, which means that we can use the same toolset to analyze them. That is precisely what makes De Waal's system ideal for this paper since our case studies shift from physical landscapes to mediated architecture and to pure media constructs. He names five components that define an urban -or for that matter, any –interface: Platform, Program, Protocol, Filter and Agency.

The Platform is the environment in which the city dwellers are brought together. This environment can be physical or virtual, as long as it mediates communication between people. Example: a park, a city square, a mailing list, a bulletin board, a mobile phone, Facebook.

Program refers to the activity or mode of use, or affordances, of the Platform. It can equally describe an architectural, a social or a software Program. Example: a picnic at the park, a residential block by a neighbourhood street, a bakery at a square, a calling and text messaging package for a mobile phone, instant messaging and photo uploading software on Facebook, etc. as de Waal says, a Program imposes an order[56].

Protocol refers to permitted or accepted and understood behavioural patterns. It can range from specific laws to unspoken rules and tacit agreements. A typical example would be the social Protocol of behaviour in a train with strangers as to the distance being kept, eye contact and volume of one's voice. However, Protocol would also include "likes" on Facebook and intentional missed calls on a friend's phone.

A Filter, like the name implies regulates who can or cannot use the interface. It brings certain elements together while it separates others.[57] Example: in a posh suburban neighbourhood in Los Angeles the lack of public transport and the extremely high property prices Filter out people of lower incomes and at the same time draw in wealthy residents. Accordingly, the need of a mobile internet connection in order to effectively use Foursquare filters out people without access to mobile internet.

Agency refers to capability to change the dynamics of the interface. Said differently, it is about control over the rest of the four elements. Example: the Agency in the case of Facebook lies exclusively with the corporation, which

tightly controls the way its Platform can be used. On the other hand, in a local neighbourhood street Agency lies partly with the residents and partly with the local policymakers.

Interpretation of two typical examples under de Waal's interface theory

In order to better understand the application of the five interface components in an urban context we will use two examples of urban interfaces; one physical and one digital. The physical public space example is Yoyogi Park, one of the largest parks in Tokyo. The digital example is the social networking and micro-blogging Platform, Twitter. It must be noted that we are not evaluating either example – this would require a different research of its own. We are simply applying de Waal's theory to showcase how we can understand both urban media and physical public space through the logic of the interface.

Yoyogi Park as an urban interface

Yoyogi Park is located adjacent to Meiji Jingu Shrine in Shibuya, and it is one of the most popular parks in Tokyo. Unlike the city's multiple gardens, Yoyogi never closes down; it enjoys uninterrupted and varying use throughout the day and the year. Apart from the numerous urban subcultures appropriating parts of it –the Rockabilly dancers at the Meiji entrance on Sundays being a typical example–, individuals or small groups of Tokyoites also use Yoyogi as picnic grounds, sports practice field or simply to relax in a usually quiet environment. Street artists are a regular presence while monthly festivals occupy part of the grounds for two or three-day intervals. The park's usage varies widely according to season as well: during the days of the cherry blossom peak in spring, thousands of people gather up to eat, drink and enjoy the scenery; similar but less extensive activity is observed during late autumn, in accordance with the leaf colour-change.

Despite its size and complexity as an urban space, Yoyogi Park is easy to analyse through the urban interface paradigm. The physical premises of the park comprise the Platform; this is where people meet and interact. The Program has some stable and some varying components. On the one hand, there are canteens and food stalls, as well as continuous use of the park as an open exercise and leisure area for jogging, walking the dog, lunch breaks etc. During weekends the influx of activity increases rapidly and extra Programs are added: dancing and acting troupes practice; music bands perform; picnics become larger in size and duration; amateur sports teams organise small tournaments etc. Monthly activities are larger in size and include; thematic international festivals, i.e. Brazilian, Thai, etc; open-air concerts and large-scale activist events like Tokyo Pride. Finally, there are annual activities related to national holidays and the changing of seasons; all these constitute the Program of Yoyogi Park. The Protocol is dictated by what is considered appropriate public behaviour in Tokyo –from littering to

nudity–, but it also varies according to the Program. Slightly different Protocols apply to the various activities described before; people tend to socialize more openly during cherry blossom viewing or avoid contact while they are jogging with a friend. This happens because the various Programs of the park operate in different social territories, shifting from public to parochial and sometimes even private realm. Therefore, the Protocol follows conventions that apply to the corresponding social realm. Yoyogi Park does not have a strong filtering mechanism; it is free to enter and open to anyone, which also includes fringe members of society such as homeless people and, moreover, it is centrally situated, which means that it attracts a significant amount of foreign visitors as well. Finally, Agency is a little more complicated to describe. As in any public space, the national and metropolitan governing authorities dictate what is legally allowed or not. However, users of the park have Agency as to how they wish to use it as long as the activities remain small scale and do not require a permit; in the latter case the governing authorities reserve the right to decide what is considered acceptable use of the park and of course they are subject to public scrutiny for the choices they make. An exception might be observed in social-media driven incentives such as flash-mobs, which by their very nature are organised in a decentralized way and manifest themselves as disruptive events of short duration. Two examples are annual 'pillow fight day' and 'zombie walks'. It must be noted, that pervasive gaming is conceptually related to these last examples.

Figure 5 Yoyogi parochial realm, activated on Sundays: the Rockabilly corner

Figure 6 Yoyogi as an interface

Twitter as an urban interface

Twitter was founded in 2006 and gradually evolved into the largest micro-blogging service online, counting two hundred million active users as of 2013[58]. A blog is a website that features periodically published postings in the form of a chronological log; a micro-blog is a development of the blog concept: the user shares short messages with the public and each user has a list of people who are following their messages. Micro-blogging is like sending an SMS online to a large number of people. These messages become aggregated in each user's profile; users can decide whose messages they wish to receive, but not necessarily who can receive their messages, which are accessible by anyone. Twitter's messages can incorporate pictures and most importantly: they can be geo-located if the user wishes so. Furthermore, a system of labels called 'hashtags' allows users to categorize their messages; therefore creating a constellation of 'hashtags' whose deployment can indicate societal trends in urban space.[59] Twitter has been especially powerful in communicating news and commentary on current affairs, with some researchers even talking of Twitter-fueled revolutions during 2011 in Arabic countries. What is of interest to this research though, is not to judge the effectiveness of Twitter; it is rather to see how it fits the interface paradigm even in spite of having no physical components.

The Platform of Twitter is its website 'twitter.com' or the corresponding app if it is accessed through a mobile device. Through their 'home' screen, users can see the messages of the people they follow or even 'discover' trending topics that dominate the Platform at any given moment. The Program is easy to name: micro-blogging. However, this entails a variety of complementary behaviors, from personal messaging to news broadcasting, that stem from the flexibility and simplicity of the Program. What really defines the scope of Twitter is the Protocol since there is a limited repertoire of actions that users can complete. These include: posting a 140-character 'tweet'; re-posting someone else's 'tweet'; 'favoriting' a post; 'replying' to a post and so on. The set of allowed interactions is simple enough to permit a variety of behaviors but also limited enough to keep the particular character and format of the medium recognizable. The Filtering mechanisms of Twitter are more difficult to define; while anyone with internet access can typically use the service –which might be seen as a Filter although internet access is increasing rapidly as we saw in chapter two–, there have been cases where governments banned access to the service, which was considered impossible to control and politically dangerous.[60] This is directly related to the nature of Agency in the case of Twitter. The Platform and Protocol are tightly controlled by the developers.

While users have been able to tweak the Program according to their needs and personalize their use of the service, they do not have any real power over it. The content posted on the Platform is relatively unrestricted –notably edited by the administrators for obscenity, offensive behavior against other users and trademark misuse.[61] Government control over the service has also been a

contested issue; while Twitter does not comply with national guidelines for content, some countries have banned the service altogether. This, however, is better described as censorship rather than true Agency integrated into the medium's function.

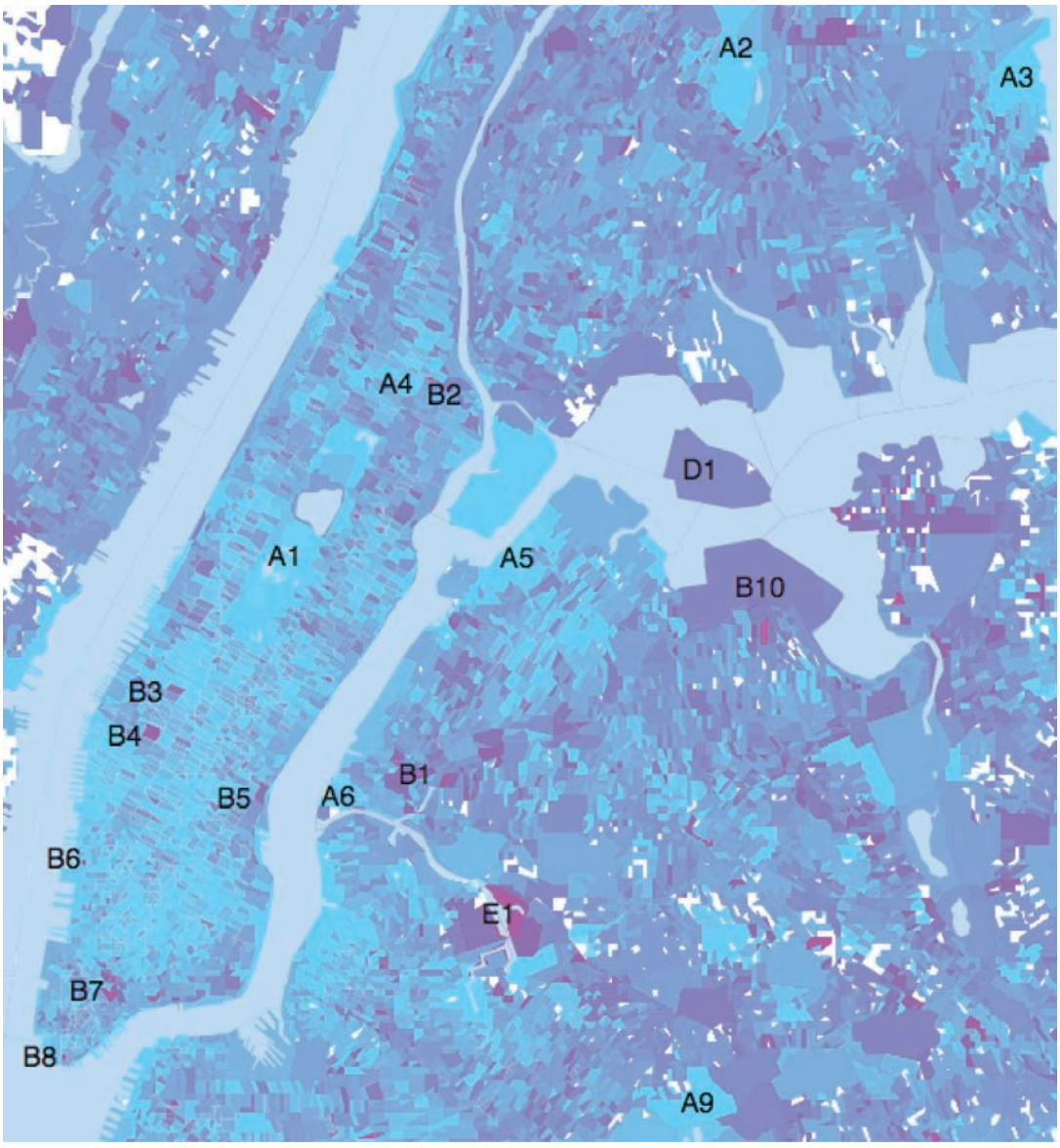

Figure 7 'Happiness map' of New York from aggregated tweets. Light blue means happy sentiments, purple means unhappy.[62]

Figure 8 Twitter as an interface

The first media architecture: Cedric Price and the Fun Palace

Cedric Price is central in the discourse of media architecture and relevant to the central research question of this paper because in 1964 London –for the first time– a true architecture of information was almost realized. That architecture was the Fun Palace.

Cedric Price, Joan Littlewood and the birth of the Fun Palace

Cedric Price graduated the Architectural Association in London in 1957 in a rather memorable way; he had Peter Smithson walking out on his final project presentation cursing: "I thought this was a school of architecture, not a bloody advertising agency."[66] The reason for the outrage is telling of Price's character and later career; he gave the thesis assignment an ironic twist and treated it as a product presentation, not without a dose of intentional banality. According to his biographer Stanley Matthews, he delighted in provoking and challenging established views on any conversational topic that he would get involved with[67]. Because of, or in spite of, his personality he managed to befriend a lot of socially prominent people from politicians to socialites to pioneering academics like Buckminster Fuller. This did not consequently translate into a successful career though. For the first five years after his graduation he had only completed one small private project.[68]

Cedric Price was a young and barely known architect when in 1962 at the fashionable party of a Labour MP in London he met theatre director Joan Littlewood. Littlewood ran her own independent theatre group and her work was driven by strong political conviction: she wanted to empower people through theatre and give them a voice of their own. While being prominent, her social theater experiments were losing impetus and she was disillusioned by the lack of support from both the state and the public into her projects, which she viewed as a much needed tool for the uplifting of disadvantaged social classes. Littlewood told Price of her dream of

> "a space where everybody might learn and play; where there could be every kind of entertainment, classical and ad lib, arty and scientific; where you could dabble in paint or clay; attend scientific lectures and demonstrations; argue; show off; or watch the world go by"[69]

Price was intrigued by the idea and started working on it while Littlewood was abroad in Africa pursuing her own projects. Only when she returned in 1963 and visited Price in his office did she realize that he was serious about collaborating with her, having already produced a series of drawings and models. It took them a year to assemble a team of collaborators, including cyberneticist and systems designer Gordon Pask, and produce a concise proposal that they could pitch to the London County Council (LCC).

A kit of moving parts, assembled by the user

The Fun Palace represented cutting-edge technology for its time both in its innovative construction and in its intended operation. Price believed that through the correct use of new technology the public could have unprecedented control over their environment, resulting in a building which could be responsive to visitors' needs and the many activities intended to take place there. As the marketing material suggested, there was a wide choice on offer:

> "Choose what you want to do – or watch someone else doing it. Learn how to handle tools, paint, babies, machinery, or just listen to your favourite tune. Dance, talk or be lifted up to where you can see how other people make things work. Sit out over space with a drink and tune in to what's happening elsewhere in the city. Try starting a riot or beginning a painting – or just lie back and stare at the sky."[70]

These were housed in a steel structure, open on the ground level and fully serviced by travelling gantry cranes that would rearrange the structure's components on a daily or weekly basis. The building comprised a 'kit of parts': pre-fabricated walls, platforms, floors, stairs, and ceiling modules that could be moved and assembled by the cranes. Almost every part of the structure was variable and interchangeable. The most evocative and concise explanation of the operation of the Fun Palace is provided by Price himself in the promotional leaflet that circulated in 1968, after the project had been repeatedly re-scheduled and faced an uncertain future due to political machinations:

> "Its form and structure, resembling a large shipyard in which enclosures such as theatres, cinemas, restaurants, workshops, rally areas can be assembled, moved, re-arranged and scrapped continuously [...] But the essence of the place will be its in-formality: nothing is obligatory, anything goes. There will be no permanent structures. Nothing is to last for more than ten years, some things not even ten days: no concrete stadia, stained and cracking; no legacy of noble contemporary architecture, quickly dating; no municipal geranium- beds or fixed teak benches."[71]

The descriptions might strike a reader as too vague for a –not purely conceptual– real world architectural project. However, the vagueness was intentional and a direct product of the Fun Palace's central design principle. In Stanley Mathews' words, its programme "would be ad hoc, determined by the users, and like a swarm or meteorological system, its behavior would be unstable, indeterminate, and unknowable in advance".[72] To the contemporary reader such an endeavor seems probably less alien than it did to Littlewood's and Price's contemporaries; this is the sort of behavior one expects from interactive media like collaborative documents, massively multiplayer video games or networked social platforms, where millions of users do interact and often edit the medium itself. In 1964 though, there were no social media; computers occupied whole building floors

and operated on cardboard punch cards, exhibiting less than one-thousandth of the processing power of a store-bought smartphone[73].

The first programmable architecture

Despite the tremendous technological limitations, Cedric Price did not simply envision this interactive system, but he fully intended to build it. He was aware of the nascent field of Cybernetics –Norbert Wiener defined cybernetics in 1948 as the scientific study of "control and communication in the animal and the machine."[74]– and related Game Theory through a series of lectures at the Institute of Contemporary Arts (ICA) during the early '60s in London; their

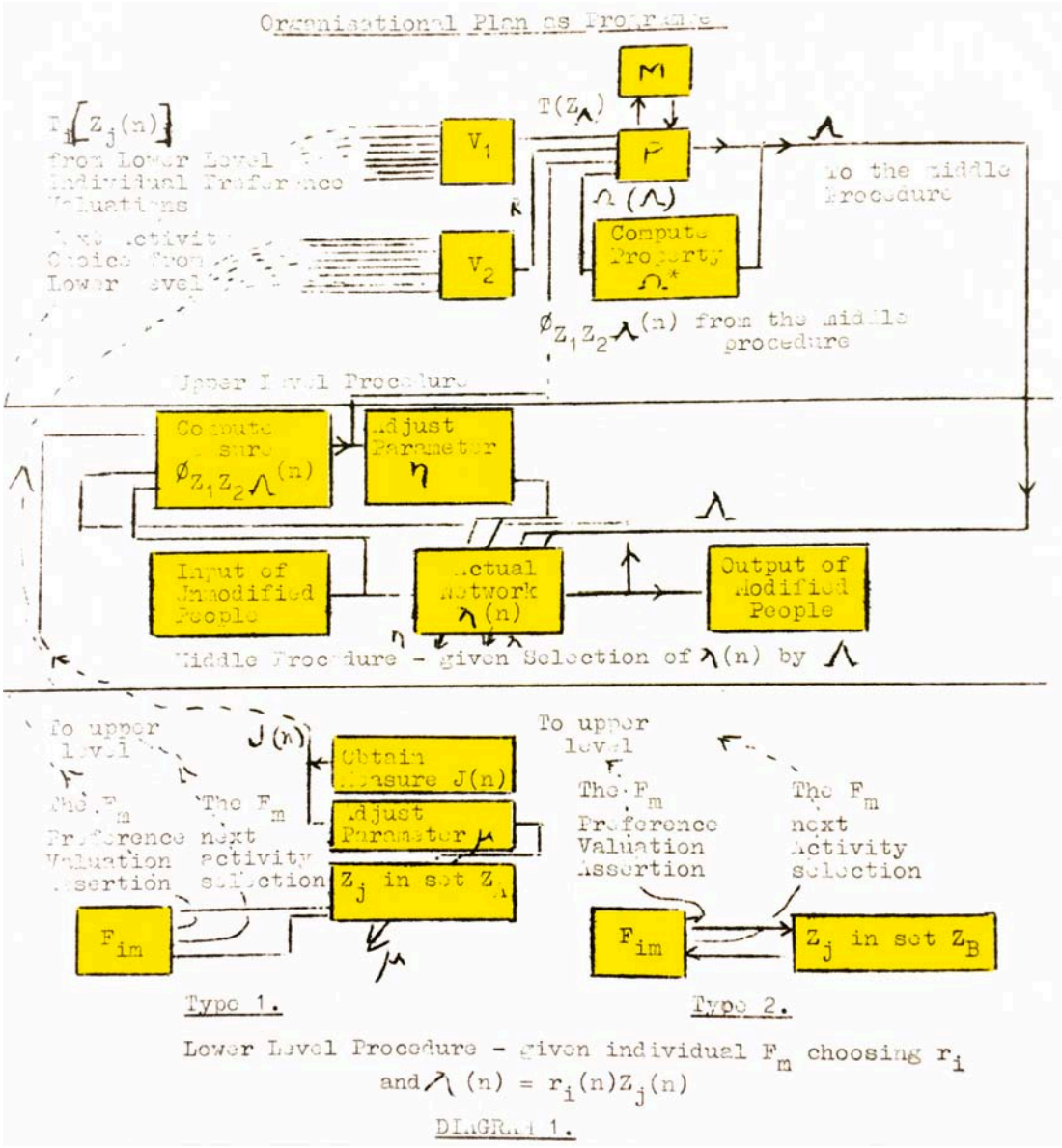

Figure 9 Diagram of the cybernetic control system of the Fun Palace by Pask[75]

purpose was to bring together cutting-edge researchers from both scientific and artistic fields and produce creative cross-fertilization. As soon as it became clear that the Fun Palace was not a building in the traditional sense but a system that would need to learn and adapt its behavior, Cedric Price realized that in order to realize it he needed expertise that did not lie within the field of architecture; that is why he contacted Gordon Pask.

Gordon Pask was a psychologist and cybernetician –a rather arcane term nowadays– who specialized in systems theory, who at that time ran a successful consulting firm. He was intrigued by the implications of the Fun Palace and the opportunity to participate in what seemed like a socio-spatial experiment of unprecedented scale, and therefore agreed to chair the Cybernetics Committee of the project. In contemporary terms, the role of Gordon Pask was that of a software engineer. He was going to write the operating system on which the Fun Palace would operate; the input would consist of users' activities inside the Fun Palace. These activities would be quantified either directly by the users through input interfaces –by manipulating buttons or levers– or by an intermediate process whereas the cyberneticians' team would translate their own observations to punch cards and feed them into the system. By January 1965 the Cybernetics committee of the Fun Palace had produced a flowchart; in all respects it was an ink and paper computer. The chart was the backbone of a comprehensive system that integrated interactive games, hyperlinked knowledge databases, communal activities and live media feeds into a cybernetic user-feedback loop. In one of the committee reports Pask expressed his wish to achieve

> "Determination of what is likely to achieve happiness. In particular the issues of philosophy and theory and principle involved in determining what is likely to induce happiness and what role the organization should play in relation to the leisure of an automated society."[76]

New architecture for a new leisure society

Pask's words bring us to another significant aspect of the Fun Palace: its political dimension. Co-creator Joan Littlewood declared the Fun Palace was a 'laboratory of fun'[77]. The discourse surrounding fun was strongly connected to the so-called Politics of Leisure that were especially prominent in the United Kingdom of the '60s. Post war projections had indicated that increasing automation in the workplace would enhance the current trend towards shorter working hours and therefore Britain would have to lead a predominantly leisure-based economy. As people would earn the same by working less, a new market would be created around their spare-time activities. The social implications of a leisure society were a major concern for the Labour Party in 1959 as Matthews asserts that:

> "British social critics and politicians alike sought (sometimes in a rather patronizing and puritanical spirit) to channel working class free time away from idleness and unacceptable forms of leisure (such as crime, alcoholism, and political revolution), towards new constructive and

productive uses, through newly organized recreational, educational (liberal) or consumerist (conservative) ventures"[78]

It is in that context that we must also examine the Fun Palace. Its creators – especially Littlewood– meant for it to be a social machine for the empowerment of the working class. However, they had to pitch it to the authorities as an educational leisurely activity embedded in the general political discourse of the time; the words leisure and education were used almost interchangeably in the project's documentation. Additionally, the Fun Palace was conceived as an attack against the perceived leisure/work time dichotomy, which Price and Littlewood considered artificial and limiting. The radically new architecture that they were proposing held the promise of a balanced existence, or as Littlewood wrote "work and leisure overlap and merge: life becomes a whole".

The anti-building

Unfortunately, after consecutive delays, changes of governments and restructuring of the London County Committee, it had become clear by 1968 that the Fun Palace was a lost cause. In the end it never got realized. This means that we will never know whether it would work as intended or what sort of social change it could bring about. Nevertheless, after the preceding analysis of the project we can't help asking the question: what exactly was the Fun Palace? After a certain Point, Price perceived the Fun Palace as an 'anti-building' and even referred to himself as an 'anti architect' (Mathews, 30).

The field of architecture does not reserve any specific vocabulary to describe moving and morphing structures; after all the vast majority of architectural works are supposed to remain unchanged during any specific mode of operation[79]. It is clear though that by describing it as a building we eschew its essential characteristics. The Fun Palace did have a physical structure and it was going to be built in a specific site in London; the site changed two times before the project was shelved. Since the most distinctive feature of its structure were the moving parts, i.e. the floating gantries and rotating escalators, one could safely describe it as a mechanism or an urban scale machine –not to be confused with modernist and functionalist concepts of buildings as machines.

On the programmatic side, the Fun Palace did have a programme in the form of a collection of activities that could potentially be hosted within its premises. Therefore, the programme was not infinite but it was definitely mutable both in spatial and in temporal terms. However, architecture offers adequate vocabulary for this type of condition. By running the risk of reducing it into something far less flexible and exciting, one can say that the Fun Palace was the epitome of multi-purpose architecture. In that respect –including certain visual qualities– it also inspired the Centre Pompidou in Paris; but that is as far as similarities go. The essence of the Fun Palace lies in its feedback mechanism and social agenda. It would be no exaggeration to say that the whole project was a mechanical computer running on an input of human activity, rearranging itself to respond to

and optimize said activity. The Orwellian implications of such an endeavor might seem obvious to the contemporary reader, but they were offset in the 1960s by an exaggerated optimism towards the improvements that technological innovation could bring into people's daily lives. Social engineering was seen by Pask's Cybernetics committee as a valid way to create empowered, conscious and happy citizens, or in anthropological terms, to create a new public realm.

Summarizing the Fun Palace as a social-engineering machine of urban scale, a clearer image of its function starts to surface: that of an urban interface; an interface between the city as a public realm and the disjointed working class without any real control over the flow of information that they were exposed to. It is precisely when viewed as an interface that the Fun Palace can produce valuable insights in order to understand internet-era urban media, or in this paper's case, ubiquitous urban games and their capacity to form urban publics. Fortunately, Dutch researcher Martijn de Waal has developed a methodology that views the city and its constituents as interfaces between the individual and the public. This study will apply de Waal's model on both the Fun Palace and ubiquitous games to highlight the similarities, the differences and most importantly, the potential underlying a conscious deployment of urban games in the context of contemporary "smart" and networked cities.

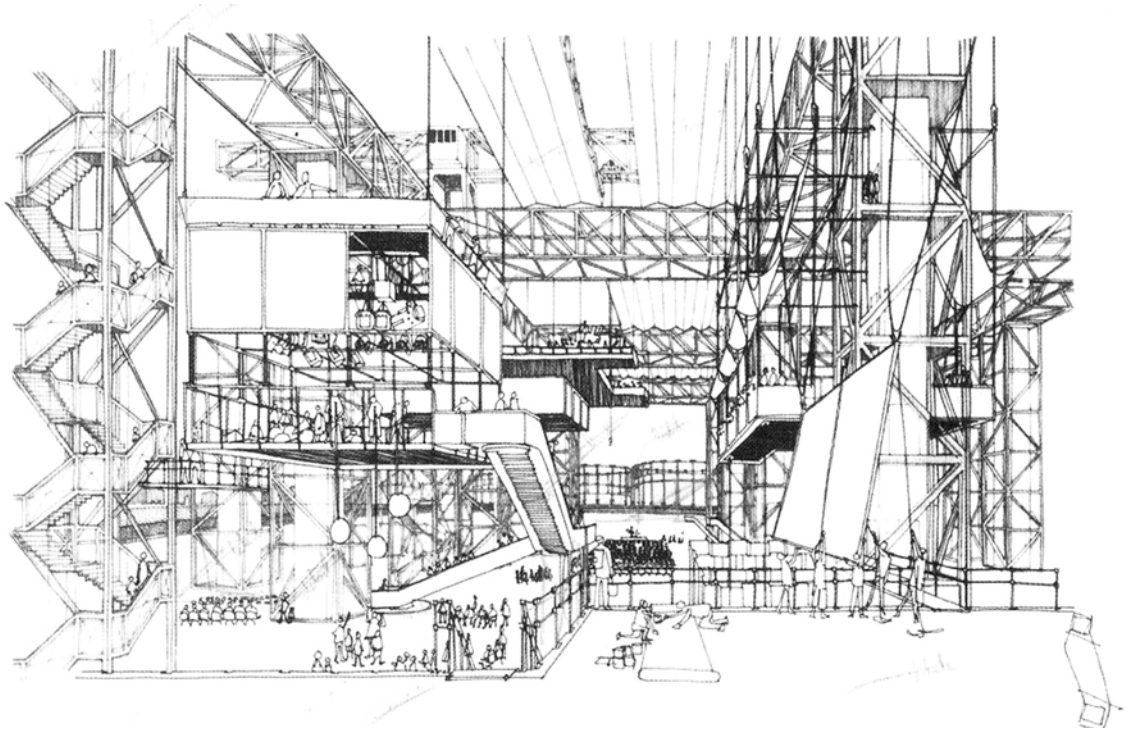

Figure 10 Visualization of the Fun Palace circa 1964[80]

Chapter 3

This last chapter deals directly with the subject matter of the research: pervasive games. The first part of the third chapter will properly circumscribe the field of Pervasive Games and present them within the context of game design theory. Subsequently, in the second part of the third chapter, the six case studies are presented and analyzed according to the theoretical background that was analyzed throughout the second chapter. The last part of the third chapter will summarize the findings. The following three research questions form the guidelines for the analysis:

a) Under what circumstances can pervasive games work as effective urban Interfaces?
b) How is the idea of disruptive play –relevant and politicized in the '60s– introduced into today's 'smart cities' by pervasive games?
c) What is the relevance of leisure in the context of an information-driven urban environment?

This is a qualitative case study that was conducted based mostly on meta-analysis of existing literature on four of the game examples, since these games have been discontinued and are not commercially available. In the case of Ingress –Google's proprietary Pervasive Game– the opposite is true: the game has been out for barely more than a year, therefore there are so far no academic papers published on it; however, the writer was able to conduct primary qualitative research. Finally, PocketOulu was developed by the writer as a prototype and all observations rely on feedback from casual testers throughout its production cycle. A formal, quantitative user study is being set-up as this thesis is being written.

Breaking the rules of play: Pervasive games

Pervasive[81] games are a very recent phenomenon; the very term was coined in 2001[82] although the first actual activity that would fall under the description dates back to the late 1970s[83]. The research field that developed around pervasive games is consequently very young and suffers from ambiguity over practices and definitions. In this paper we will follow Stenros, Montola and Waern's model, according to which a pervasive game's fundamental quality is that it breaks the traditional boundaries of play and invades into everyday reality. Specifically:

> "A pervasive game is a game that has one or more salient features that expand the contractual magic circle of play spatially, temporally or socially"[84]

The 'magic circle' is a term coined by Dutch historian and cultural theorist Johan Huizinga where he describes it as a commonly agreed upon social contract

without which play or any sort of ritual activity –for he considers ritual and play to be one and the same thing– would be impossible.[85]

> "All play moves and has its being within a play-ground marked off beforehand either materially or ideally, deliberately or as a matter of course. Just as there is no formal difference between play and ritual, so the 'consecrated spot' cannot be formally distinguished from the play-ground. The arena, the card-table, the magic circle, the temple, the stage, the screen, the tennis court [...] All are temporary worlds within the ordinary world, dedicated to the performance of an act apart."[86]

When we play, we enter these temporary worlds and we agree that certain rules cease to exist and others take their place; the moment when we enter and the moment when we exit are clear both in spatial and in temporal terms. For Huizinga, play has a starting point and a closure point and takes place in a demarcated area; a playground or a gamespace in contemporary terms. The identity of the participants is also clear-cut, i.e. there is mutual understanding about who is playing, merely watching or completely unrelated. This is what makes pervasive games such a remarkable case of urban media: they are defined by the very negation of the rule-set that defines the activity of play.

'Is this part of the game?'

Returning to Stenros, Montola and Waern's definition, one sees that there are three ways pervasive games expand –or better, blur– Huizinga's magic circle: temporally, spatially and socially. Temporal expansion means that the game no longer has a fixed duration; it might begin at any moment, end at any moment and most importantly it runs parallel to other everyday activities. Namely, one does not stop what they are doing in order to play because everything happens simultaneously. Spatial expansion on the other hand expands the traditional notion of a playground, sports field or even gaming board; a spatially pervasive game is not confined in one place, it expands in space and may include anything in one's surroundings. Finally, in some types of pervasive games there is no clear demarcation between players and non-players; either spectators are included into the game, consciously or not, or owing to temporal and spatial expansion a player is never sure about who else might be participating. The 'is this part of the game?' question comes up all too often in this type of play and is indicative of pervasive games' ability to blend with everyday reality.

There is one more important attribute of the activity of play that is highlighted by Huizinga and is retained when we make the transition to pervasive games. The 'magic circle' or 'consecrated spot' places the participants under protection from social norms that they would otherwise have to follow. When acting within the magic circle, players can operate under the excuse that 'it is just a game'. This duality of pervasive games makes them by definition disruptive in most social

contexts. On the one hand they expand the magic circle of play and let the game leak out into the public realm, but the players on the other hand still act as if they are shielded by the magic circle's social cocoon.

> "When discussing spaces as social constructions, it is clear that people are perceived to inhabit many spaces simultaneously and alternatively [...] Pervasive gamers inhabit a game world that is present within the ordinary world, taking the magic circle wherever they go"[87]

This can have both negative and positive effects; from gamers acting recklessly in public and causing accidents to cases where new social dynamics are generated as strangers come into contact with each other. The latter case is interesting because the pervasive game acts as a social lubricant on an urban scale, not too dissimilar to the Fun Palace's intended purpose.

Pervasive games and locative media

Pervasive games do not necessarily need technology in order to run; assassin, which is considered to be the first real pervasive game, played out in college campuses by students following a simple set of rules and using everyday items as props. The proliferation of mobile media since the beginning of the '90s though, brought a whole new dimension into the field. One can actually see the publishing of pervasive games coinciding with the increasingly wide adoption of wireless connectivity and geo-location technologies. There are multiple reasons for that correlation, but most of them boil down to the dual use of the phone as a 'place marker' and a 'territory device'. Namely as de Waal pointed out, we use the mobile phone as one of the main interfaces through which we interpret and navigate the city; our sense of presence is defined by our mobile connectivity while at the same time we communally build a parallel second 'version' of physical space by reading, photographing and tagging it through the phone. Geo-location technology combined with mobile networking capabilities have created the ideal platform for setting up pervasive games that act as 'mirror worlds'[88] or approximate the mental experiment of the 'living map', where the device stands as the interpretation device between an unseen layer of the world and the user. It is enlightening that the world's most successful pervasive game as of July 2014, Ingress, is based on a modified live version of Google maps. It must be noted, however, that the majority of pervasive games of the last decade were centrally run productions with Hollywood-level budgets and were employed as centerpieces for advertising campaigns. The first game of this linage was called The Beast and ran its course within a few months in 2001 as promotion for Steven Spielberg's film AI; it is worth mentioning because it is the very game for which the term 'pervasive games' was coined and it pioneered the use of real-

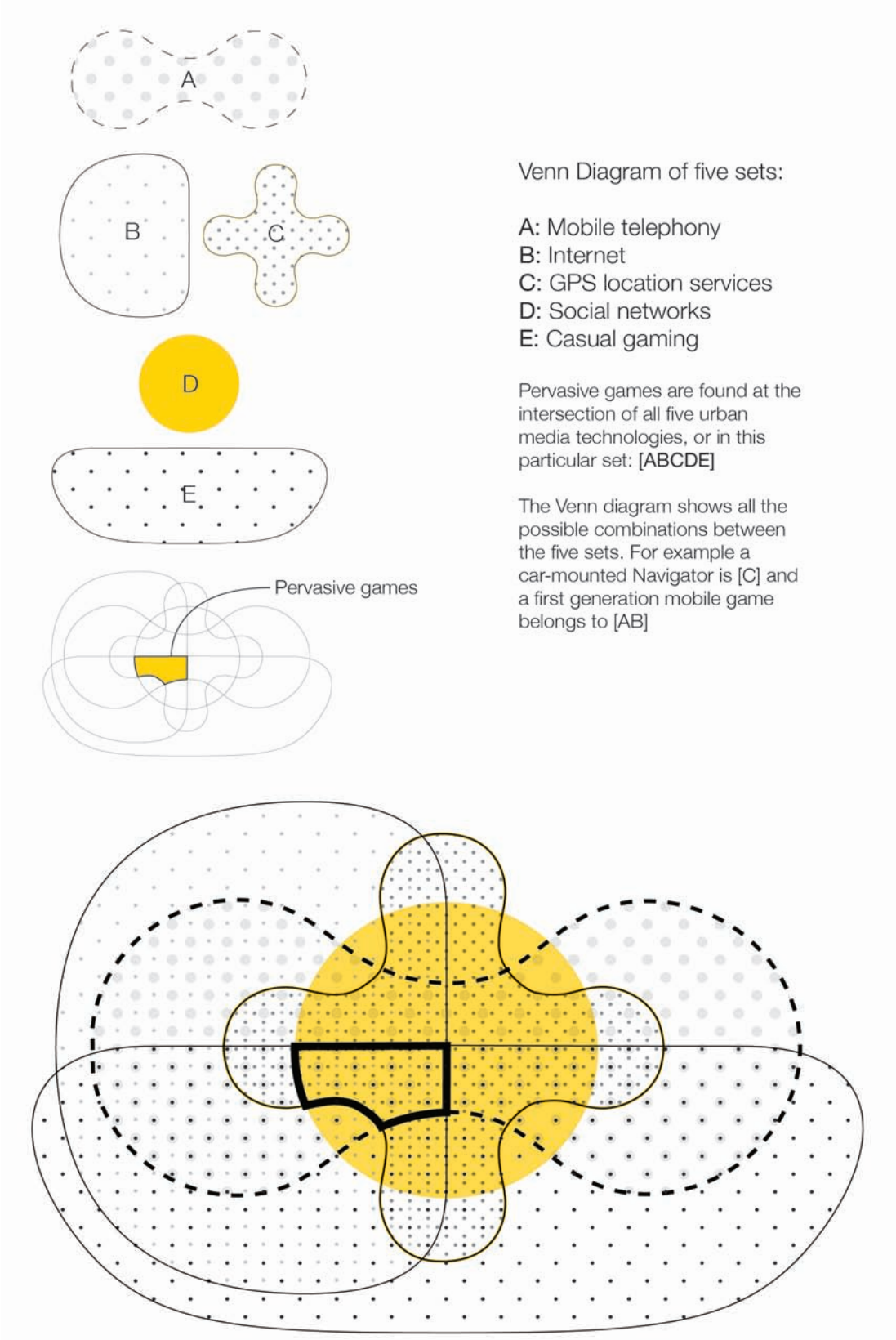

Figure 11 Venn diagram showcasing the multi-technological intersection at the centre of which lie pervasive games.

world resources such as websites, payphones and advertising billboards as part of the game itself.

This paper does not focus on pervasive games that were employed as marketing tools; what is of interest are the games that play out in public space and alter its perception and appropriation. That is why four out of six of case studies presented here, could be described as 'living maps'. These pervasive games belong to the category of urban media but are driven by a competitive or collaborative element; the users –or players– are driven to exploit them unto their limits in order to get an edge over their adversaries or fulfill collaborative goals. The pervasive games that we examine take place in physical space and users have to move around in order to play; they do not necessarily have to look around as well but that is linked to a technological limitation that we are slowly surpassing. Most importantly though, these games intrude into everyday routine and have the potential to change the identity of public space. In order to examine how this is done, we will employ Martijn de Waal's Interface theory, from the previous chapter, on six case studies to highlight the ways in which they might –or might not– create new urban publics. The playful disruption that is introduced into the city works in several ways similarly to Cedric Price's Fun Palace; it is the similarities and differences between the two that will allow us an overview of the way interactive urban media can shape the use of public space in the networked city.

Case studies: six pervasive games analyzed as urban interfaces

All six games analyzed are classified as 'pervasive' according to the criteria of Montola et al.: expanding the spatial, temporal or social constituent of the 'magic circle' of play. A three-axis chart is used to show the type of Pervasiveness displayed in each game; the ranking is qualitative since there is no objective criterion that measures spatial, temporal or social expansion. The charts are used as guidelines to underline the differences and similarities between the game studies, not as a definite classification.

Subsequently, the criterion of choice for the case studies has been the element of choice that links the game to a definite component of the physical, non-ludic space. Throughout the candidate examples several different 'links' with the Public Sphere can be observed. The ones chosen for this study utilize links to:

1. Ambient technology [Insectopia]
2. Temporal and spatial life patterns [Mogi]
3. Urban Architecture [PocketOulu]
4. Nearby People [Body Movies]
5. A historical narrative [REXplorer]
6. Urban landmark topology [Ingress]

Therefore, a wide field of interaction can be observed as games are used to interrelate with a variety of non-ludic elements; from tangible ones like urban monuments to immaterial ones like ambient Bluetooth signals. The following diagram is an overview of the system of categorization according to pervasiveness, or degree of expansion.

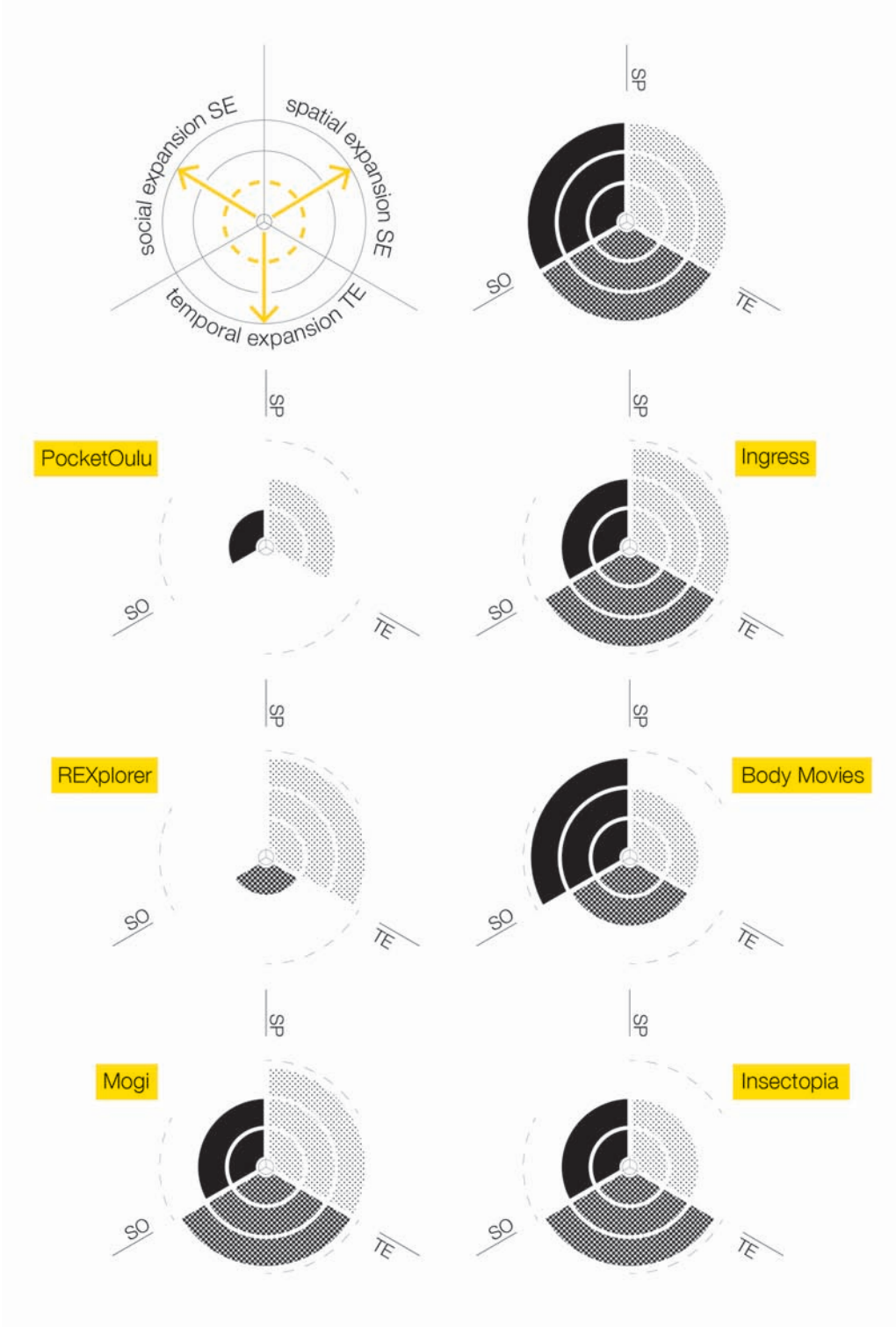

Figure 12 Pervasiveness, or expansion charts

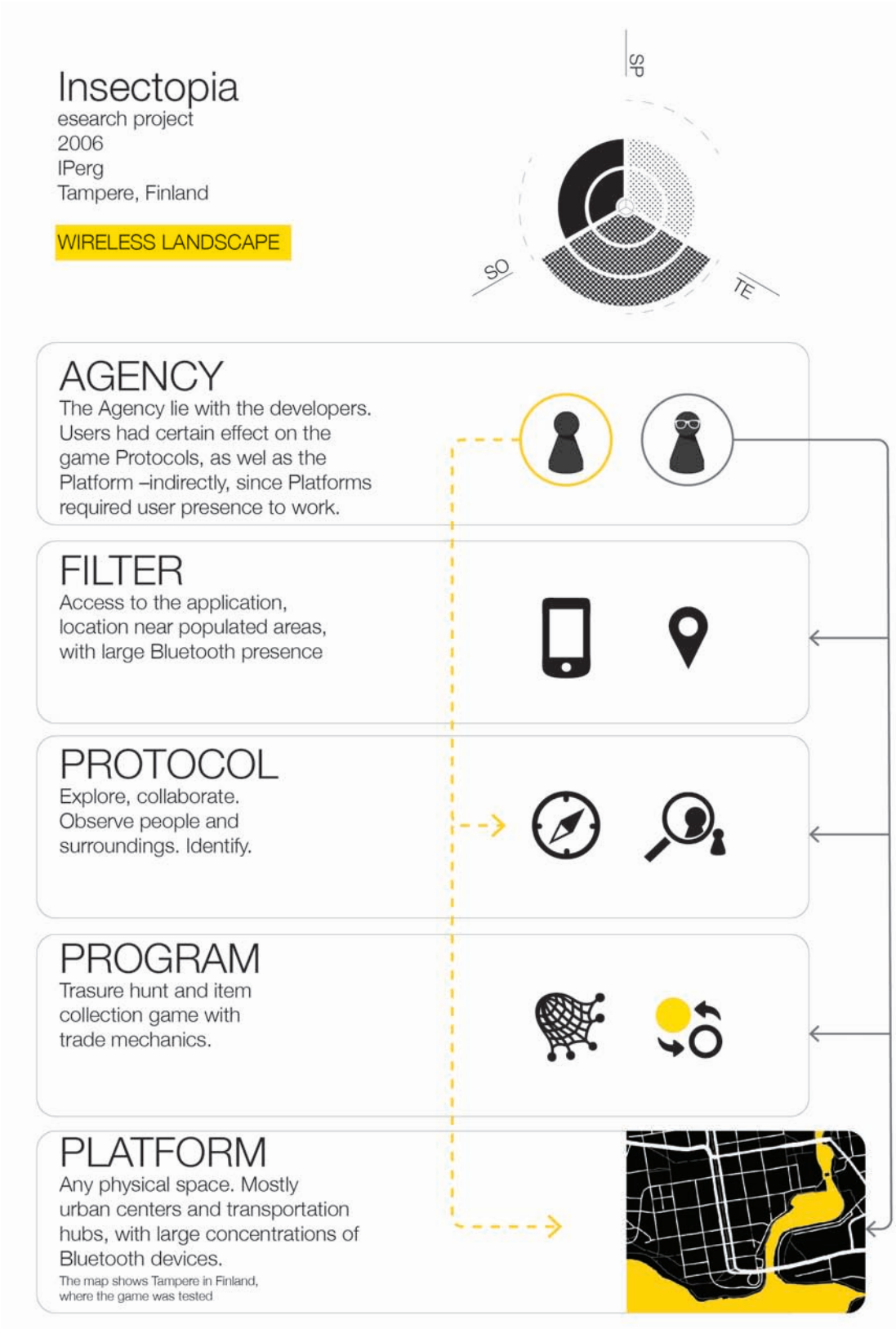

Figure 13 Insectopia as an interface

Insectopia: linked with ambient technology

Insectopia was created and released in 2006 as an experimental project through IPerG (Integrated Project on Pervasive Gaming).[90] Insectopia was a single player game played in a massively multiplayer setting. Players were supposed to explore the cityscape searching for and catching a multitude of insects, where an insect represented an active Bluetooth device. Since Bluetooth assigns unique IDs to each device, every Bluetooth enabled phone, printer, hands free or photo kiosk would be represented as a unique insect with its type generated randomly according to a rarity algorithm. Each insect has a certain score associated to its rarity and the goal of the game is to advance on the game's various global high score lists. Insects could be found anywhere where there are Bluetooth devices available, which mostly meant crowded downtown areas and transportation hubs. In order to make the game more interesting than simply harvesting Bluetooth IDs, the caught insects had to be kept alive by revisiting the source of the insect at least once every eight days, to 're-catch it'.

Spatial and temporal Pervasiveness

The game exploited the fact that there are many Bluetooth devices around the real world that have discovery turned on in their settings; moreover, these can either move around or remain stationary. The Bluetooth devices are used as generators for the game's resources and populate the parallel virtual space where it takes place; any urban environment saturated with ambient technologies can work as a parallel landscape hosting Insectopia's digital ecology. Primarily, this makes the game location independent, since it is not tied to specific geographies and objects but to densities; henceforth the topological characterization. On a second level, it limits the game's expansion to technologically saturated environments; one cannot play it in the countryside.

Insectopia extended indefinitely in time. Users were encouraged to play when they had time to spare, when idling in public transportation, waiting in queues etc. At any moment throughout the day players could take a break to check the parallel insect-inhabited topology and catch their share. However, unlike most mobile casual games played during idle time, Insectopia related to the real-time mobile technological ecosystem surrounding the player. It was not a self-enclosed game.

Social Pervasiveness

The most interesting aspect of Insectopia stemmed from the way that it encouraged players to observe their urban surroundings and start noticing patterns in people's movements. Once a player located a valuable insect –i.e. Bluetooth ID– they needed to identify the carrier of the device. If they didn't

identify the physical world carrier, they would not be able to maintain the digital creature in their collections, since insects decayed in time unless re-caught within a week. The developers themselves worried that this might cause stalking behavior, but the main observation was that players started studying people around them in a way that they did not do before; their attention was drawn to their social surroundings.

Insectopia as an interface

The Platform of Insectopia was potentially any urban public space, but turned out to be mainly mass transit and transportation hubs. This is where people met and interacted through the game. The Program of interaction, as is the case with almost all of the examples studied here, was ludic; specifically a collection and trade game with market mechanics; players were expected to exchange insects in order to enrich their collections. What is most interesting is Insectopia's Protocol, which drew non-participants into the game and encouraged players to observe their surroundings and identify other people and devices. The game's social pervasiveness stems directly from its Protocol. The Filtering mechanism was based on technology adoption: only people with the software in their devices could play the game and, conversely, only people or places carrying and hosting Bluetooth devices would be included in its ludic ecosystem.

Insectopia was developed in 2006; at that time there were still no widespread mobile operating systems unlike today and the technological market was very divided.[92] Even as late as 2009 Montola et al. would write that "There are currently thousands of phone models available for the potential player, which creates a fragmentation nightmare for the developers"[93], which as of 2014 sounds simply irrelevant. Finally, Agency belonged mainly to the developers. Insectopia was and remained an experimental game that never generated an extended community that could in turn create active feedback; a lot of potential lie in its trading system but the game did not run long enough for that to be evaluated. Agency is largely dependent upon phenomena of emergence, which nevertheless require a minimum number of interacting agents.

Despite its limitations, Insectopia can be seen as a ludic urban interface that infused the Public realm of everyday commuting with small moments of social confrontation. As Jane Jacobs wrote, "cities are, by definition, full of strangers. To any one person, strangers are far more common in big cities than acquaintances" [94] . Individual life revolves around attuning individual and collective identities; Insectopia facilitated that interaction by having the player identify strangers throughout the day during otherwise idle intervals. Even for the briefest of moments, the rule of silent avoidance of eye contact would be broken as players tried to scan the physical world for traces of their coveted wireless pray and draw non-players into the game world.

Figure 14 Mogi as an interface

Mogi: linked with temporal and spatial patterns

Mogi is a rare example of an early mobile pervasive game that was not experimental in nature but was marketed to an actual public during the early days of mobile Internet in Japan. The game was created by French designer group Newt Games and marketed in Japan by KDDI. It was a simple collection game by today's standards, but it exploited location-awareness resources extensively; since it was a commercial game, the only thing limiting the number of players was the lack of publicity –unlike Insectopia for example, which was only tested. Its user base, which stabilized at around one thousand people, was scattered throughout Japan with a significant number in the Tokyo area. It was played for several years –from 2003 to 2006– which was long enough to allow a particular subculture to emerge.

Like most pervasive mobile games of the early 2000s era, Mogi was centered on collecting and trading resources and creatures. The gameplay of Mogi consists in collecting virtual objects with a mobile phone. These items are 'localized' in the sense that users can act on them only when they are close to their position and they are projected on a real map. Furthermore, they are continuously created and renewed throughout the game. The player sees an interface called the 'radar' that features a map of an area amounting to four square kilometers. This map represents the player's environment, with their icon in the center of the mobile screen, surrounded by the icons of the other players and virtual objects situated within the one km radius. Locations were GPS-based: when players were less than three hundred meters from objects, they could capture them. Players compete to create item collections and they are classified according to the number of points they accumulate. According to Christian Licoppe & Yoriko Inada's paper on the game,

> "The basic idea is to create a community of high-tech hunter-gatherers whose activity is set in an economy based on the bartering of virtual objects and a sociability based on text messaging."[95]

Spatial and temporal Pervasiveness

Mogi was geographically limited to Japan, but in any other respect it was a spatially boundless environment that users would explore by physically moving in it. Similarly, in the temporal sense, it was a persistent environment with no definite start and end sessions; the game only ended when the company terminated it in 2006. The essential attribute of Mogi was that it acted as an augmented layer projected on the geography, with certain spatial and temporal characteristics of the environment feeding back into the actual game. Some resources would only generate near green areas such as city parks and the countryside, while others were temporally dependent, i.e. they would only spawn during specific times of the day and last for a limited amount of time. These simple mechanics created a composite augmented environment that was relevant

to both its physical and its media component. What the game designers did not foresee however, was the surfacing of certain emergent social behaviors related to the concept of personal territory.

Social Pervasiveness

Mogi was not a very pervasive game in the social sense since its user base was a clearly defined subculture of consumers who had bought the game. Interesting interactions could have taken place within the public realm had there been a larger user base, as is the case with 'Ingress' for example. One element of social pervasiveness was, however, the fact that players could not identify each other out of the game interface. When 'hunting' for an item, any person in the same area holding a phone could be a potential competitor. According to Licoppe and Inada these interactions were rare due to the small number of players, but as we will see with Ingress, they have the potential to become a common occurrence.

Mogi as an interface

Mogi is a particularly interesting case of a game as an interface, since it generated emergent social contracts in its user base. According to Christian Licoppe & Yoriko Inada, these contracts are comparable to the way Aboriginal tribes symbolically marked their flat landscapes:

> "Players gradually developed various ways to make specific, privileged claims concerning some areas within the game space and for those claims to be recognized to some extent by members of the community of players. Personalized territories are, therefore, an emergent feature of the game"[96]

As the two researchers show in their study, Mogi users treated locations as a public common and they created commonly accepted rules for its administration. One's residence and workplace was considered a "personal hunting ground"[97], which other players would not invade, while special arrangements were made for commuters whose daily patterns of movement allowed them to "hunt" in linear swathes of augmented space. Players also had to deal with the fact that their locations were at all times updated on the virtual Platform. In dense urban centers that did not have any implications, but in rural areas of Japan, harassment in the form of stalking was not uncommon as building density low and users' homes could be tracked through the game.

Mogi's Platform was at the same time the physical geographical space of Japan and its virtual mobile interface through which players messaged each other. Its Program was a collection and trade game at first, but it evolved into exploration and territory building as well; but that part of the game was emergent and not designed. The Protocol comprises its most interesting feature; it was gradually developed by the players and consisted in complicated tacit agreements about allowed areas of activity and sharing of common resources. Mogi is an interesting

case of a game that was designed as a relatively rigid set of rules but, through time, players got advantage of its affordances to expand the game experience significantly. There was no real Filtering mechanism apart from the requirement that one bought the game; free-to-play marketing strategies were not as common at the beginning of the decade. There was also a location and technology-related Filter: players had to live in Japan and use a KDDI connection. Mobile Platforms have become much more homogenized since then. Lastly, Agency mostly belonged to the developers of the game who controlled game mechanics and resources; however, the player community proved that in multi-user environments emergent behaviors that were not foreseen in its starting conditions define the final system.

As an Interface, Mogi managed to create a set of unique parochial realms that were explicitly spatial and yet stemmed from an augmented composite environment. Users both shared and segregated the parallel game space. Moreover, it might not have affected the general public realm but it did create one in miniature, where space itself was treated as public commons and regulated accordingly by the users themselves. Users participated in this commonly accepted public sphere of Mogi where anyone not accepting the common agreements was ostracized by the rest.

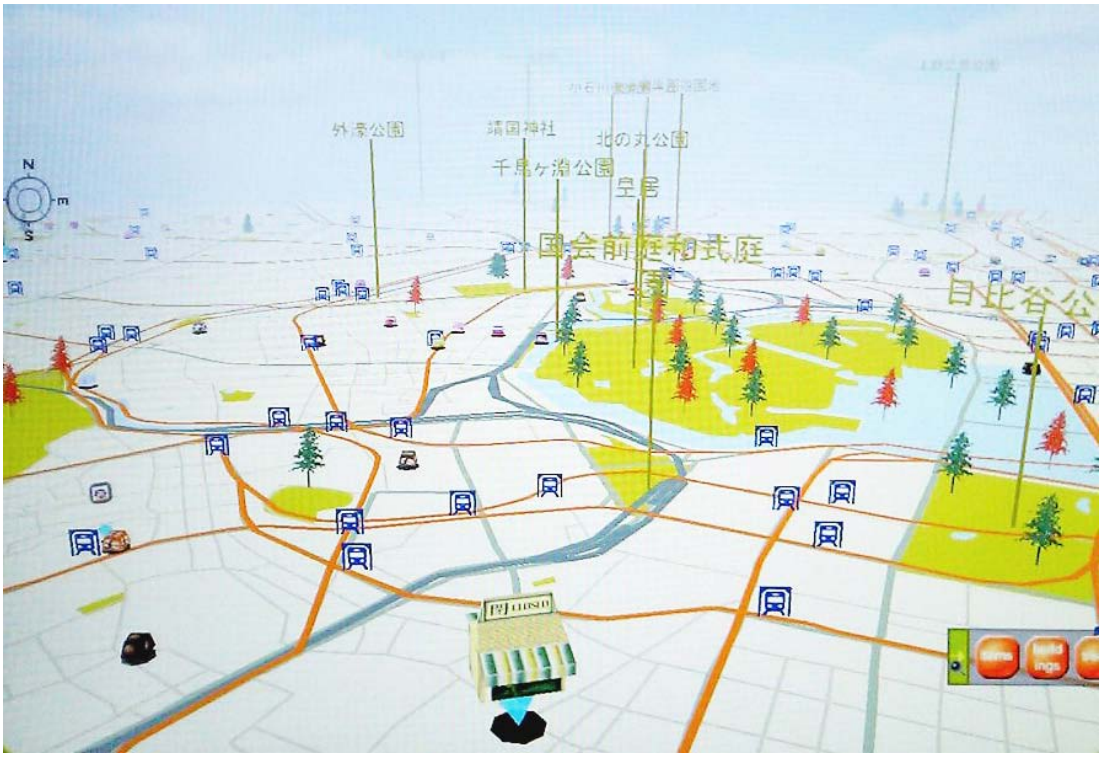

Figure 15 Screenshot from the PC (as apposed to the mobile) interface of Mogi

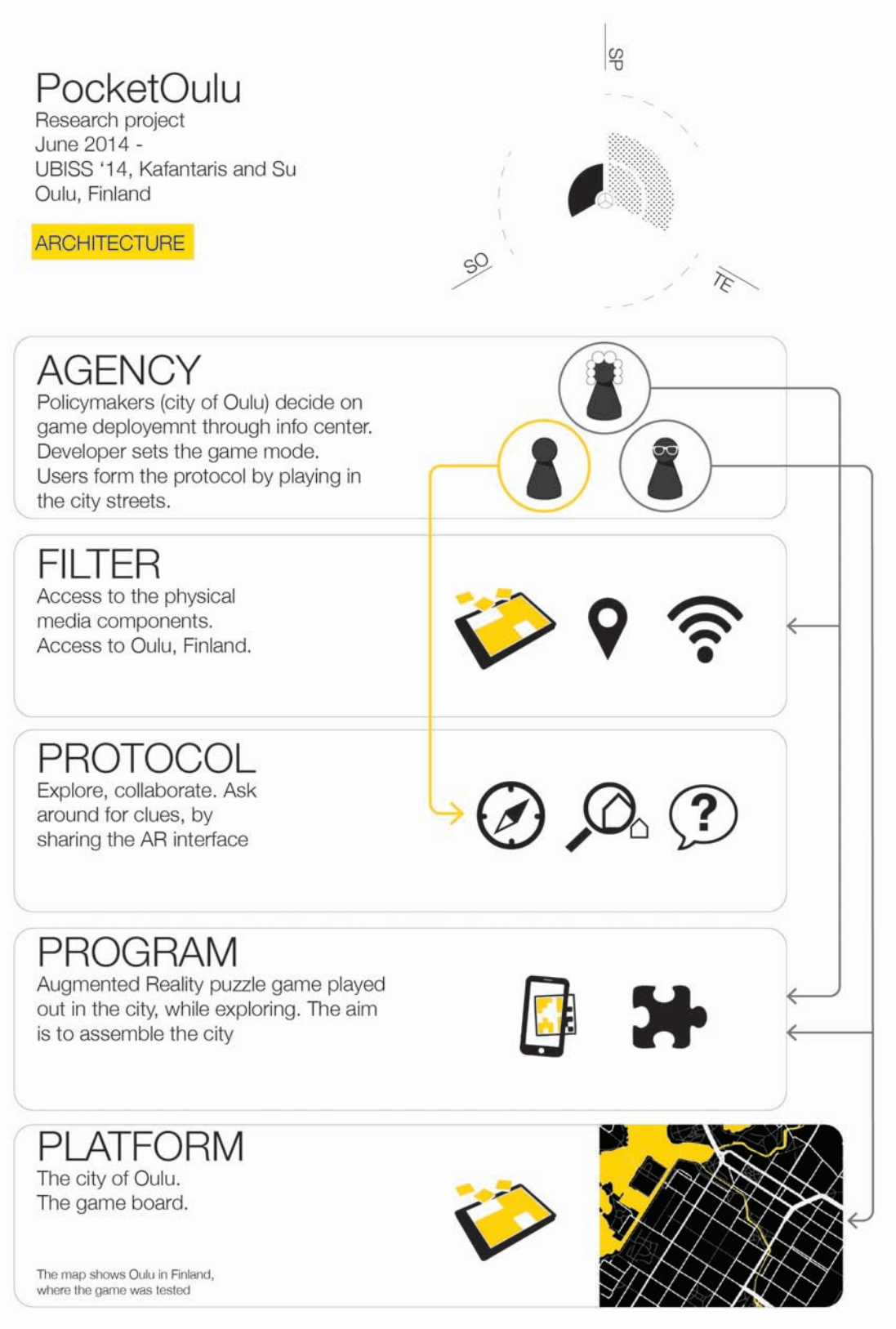

Figure 16 PocketOulu as an interface

PocketOulu: linked with urban architecture

PocketOulu was developed by Aris Kafantaris and Yuting Su during the UBISS 2014[98] as a platform for urban play. The goal was to make both visitors to the city of Oulu and locals engage with the architectural context of the historical city. The game is essentially a playing board system where more than one games can be mapped, as long as they follow the format of a geo-located 3d puzzle. It consists of a gaming board and twelve rectangular target pieces that slot into it. The board itself and the individual pieces carry Augmented Reality markers, so that when they are viewed through the PocketOulu application on a smartphone or tablet, objects are mapped on them. The board has the street grid mapped on it and the individual pieces have city blocks. The aim of the game is to wander the streets of Oulu and assemble the city properly by observing the actual blocks and matching them on the board in the correct spot and orientation. The app tracks the user's location and overlays it on the board as well, so that users know their relative position within the game environment. The board can be easily reprogrammed to correspond to a single city block. In that altered version of the game the rectangular pieces represent individual buildings. The game was play tested by the symposium and summer school participants; a user-study is underway.

Spatial and temporal Pervasiveness

It can be argued that PocketOulu is not spatially pervasive since it was limited in the area of central Oulu. However, the geographical placement of the puzzle game depends on the mode followed; the abstract board can map anything from a single building or city block to an entire city. Therefore the geographic extent of the game is in many respects unbound, thus fulfilling the minimum criterion for spatial Pervasiveness. Temporally, PocketOulu is rather traditional in that it uses play sessions with a definite start and end, when one finally assembles the correct composite city/block/etc.

Social Pervasiveness

PocketOulu is intended to be a game either played by an individual or by competing groups. The potential for ludic engagement really shows when several people are looking at the board and manipulating the pieces, trying to understand the way that the city is put together. This style of play means that the play session takes the form of a small street performance that is immediately perceived as out of the ordinary. As players are encouraged to ask locals about particular pieces of architecture and their location they draw them into the game as casual participants. Thus players take the role of ludic tourists asking for directions, only with a catch: they ask for assembly directions. Therefore, despite the fact that there is an initial distinction between players and non-players, actual gameplay encourages and rewards involving passersby.

PocketOulu as an interface

PocketOulu is the only Augmented Reality game included in this paper's case studies. The Platform of PocketOulu is at the same time the city and the gaming board; players meet and interact in the physical space of the city or around the gaming board if they belong to the same team. The Program of the interaction is a puzzle game based on orientation and recognition of architecture. One could also describe it as a game of asking for directions. The Protocol is up to the players since the only thing that is asked of them is to complete the puzzle faster than competing teams. Players took advantage of their feeling of group-safety and the liberty that their status as visitors offered them; they liberally interacted with locals and interrupted their daily routine. It is this confrontational interaction between visitors and locals that holds PocketOulu's potential for catalyzing social interactions. The only Filtering mechanism of the game is that in order to play it one needs the physical components and the application. As our intention is to distribute it through the Oulu Tourist Information Center, this means that most of the users will be visitors to the city of Oulu. Lastly, Agency lies with the developers and the city of Oulu. It is our intention, however, to make the game's toolset open-source, so that anyone could re-program or modify PocketOulu and make their own versions. This is in accordance with the fair-use open-source ethos; designers create and release into the world an intellectual work that from the moment of its release is a Public Common. In that way, PocketOulu has potential as an interface paradigm. By delivering the Agency to the user community, urban media can function as public commons.

Figure 17 PochetOulu board with 'target marker' pieces and AR application

Figure 18 Body Movies as an interface

Body Movies: linked with people

Body Movies is an interactive game-like artwork, which was deployed by artist Rafael Lozano Hemmer in several European city squares, the first one being in Rotterdam in 2001. Throughout this analysis we will refer to it as an urban game since it fulfils the criteria to be one.[99] The intended goal of Body Movies is to transform public space with interactive projections measuring between 400 and 1,800 square metres. The artist calls this type of work 'Relational Architecture'. According to Lozano Hemmer:

> "Thousands of photographic portraits previously taken on the streets of the host city are shown using robotically controlled projectors. However the portraits only appear inside the projected shadows of the passers-by, whose silhouettes can measure between two and twenty-five meters depending on how close or far away they are from the powerful light sources positioned on the ground. A video surveillance tracking system triggers new portraits when all the existing ones have been revealed, inviting the public to occupy new narratives of representation."[100]

Spatial and temporal Pervasiveness

Body Movies is deployed in a particular public space in the city and related to it throughout its run; therefore, the area of play is limited. However, the area of play is overlaid over a functional public space in which city inhabitants continue their daily routines, thus creating a mix-up between the quotidian and the ludic. The area of ludic space may be limited but its boundaries are vague, therefore achieving spatial Pervasiveness. In that sense, Body Movies can also be described as an Augmented Reality game, albeit one not needing any sort of screen as interface. Temporally, the game runs at all times from its deployment until its dismantling. Every new projection invites participation from passersby and there is no visible end to the progression of pictures projected. Then again, the deployment of the work is necessarily limited by time constraints so it can only run at any particular spot for the span of a few days.

Social Pervasiveness

Socially, Body Movies is a standard of pervasiveness. There is never a clear-cut separation between players and spectators while, at the same time, anyone coming near or crossing the ludic zone is enticed to play. Most participants become aware of the game only moments before they start playing it; it is this sense of spontaneous creative disruption that generates social Pervasiveness.

Body Movies as an interface

The Platform for Body Movies is a particular open public space, varying from city to city. The only requirements are a large walkable flat area and a similarly

large vertical surface for projections. The Program is a mimetic game, where participants try to match their shadows to the silhouettes projected; many of the participants however preferred to creatively play around with shadow projection instead. Body Movies was never created with a particular Protocol in mind, therefore the Protocol came about through players' behaviour. The set up of the game encourages communication and cooperation between strangers, therefore sidestepping many of the conventions of everyday urban life. Accordingly, no Filtering mechanism was designed by Lozano Hemmer; anyone with the capacity to be at the particular public space of the installation could participate. Therefore the Filter was directly tied to the socio-geographical constraints of the public space where it was deployed and to the willingness of local authorities to host the installation or not. Lastly, the Agency of the game lies divided between creator and participants. The artist set up all the rules but as it came out, participants appropriated the work and used it in playful ways that deviated from its stated purpose. This was embraced by the artist who conceived the piece as 'relational' from the beginning. Body Movies seems to create a provisional public sphere, where urban groups can mix and confront each other in a context that is not only playful, but also reflects back into the identity of their city through the large panoramic pictures used, which are site-specific. Martijn de Waal quotes McQuire when he describes the capacity of Body Movies to create an urban public:

> "Through mutual participation, people discover they are able to intervene –albeit ephemerally– in the look and feel of central city public space. In short, they are platforms encouraging creative public behaviour, enabling the city to become an experimental public space"[101]

Figure 19 Deployment of Body Movies in Schouwburgsplein

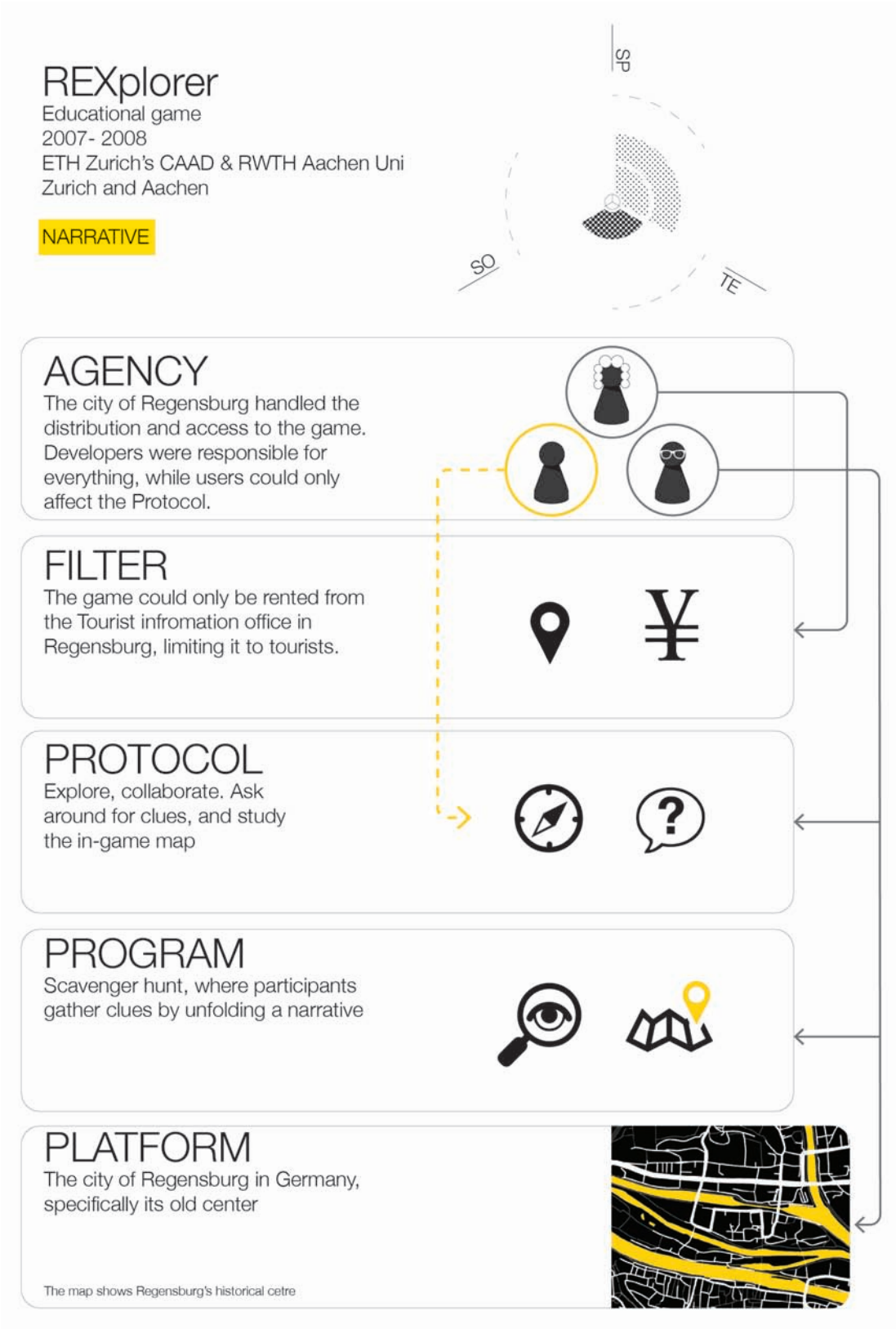

Figure 20 REXplorer as an interface

REXplorer: linked with a narrative

REXplorer was an interactive mobile & cross-media cultural-heritage adventure game service for tourists that was available in Regensburg, Germany in 2007 & 2008. The game was conceived as an extension of the REX Regensburg Experience Museum, out into the space of the city; players controlled the game with a location-tracking device based on a commercial mobile phone and followed clues belonging to a historical narrative that sent them exploring the city of Regensburg. The game was essentially a series of missions scattered around the city and linked to specific sights. Each mission has a fictional persona narrate the actual backstory of the site, contextualized into the game narrative; the persona would ask the player a 'favour' which would be granted by the player going to a next spot and completing the next quest. The actual quests consisted of finding the spots of interest and playing a motion-sensitive gesture mini-game; the purpose of the whole experience was to follow the parallel mystery-like narrative and learn real historical facts through it. Out of the games covered in this paper this is the only one that was conceived as an educational tool.

Spatial and temporal Pervasiveness

REXplorer is a typical spatially pervasive game, as it plays out in the real city of Regensburg. Since there is no separate designated area of play, spatial ambiguity converts the environment of the city into a playground. In the temporal sense, REXplorer had a definite start and end by necessity since it was promoted as a commercial rental service. During the play session, however, participants could side-track and engage in any sort of urban activities while the game was still running in the background. The play session was diluted and intermingled within a day of sightseeing at the historical centre of Regensburg.

Social Pervasiveness

REXplorer was not an ideal example of a socially pervasive game. The service was rather expensive[102] and targeted to visitors; partly because of that, it did not facilitate blurring between players and non-players. In most respects the game worked as a self-driven guided tour of the city; nevertheless, it was arguably a more social compared to tours led by an actual guide since players formed smaller and more flexible teams that were much more likely to interact with locals. Another creative possibility lies in strangers meeting at the Information Office counter and exploring the city together by sharing the service.[103]

REXplorer as an interface

The Platform of REXplorer is the physical space of the city of Regensburg, while the Program is a narrative-driven scavenger hunt with a clear educational orientation. The Protocol introduced by the game is interesting, since it worked

well with the tourists' socially relaxed status; visitors fumbling about maps are usually allowed to act in ways deviating from the norm. Similarly, the players of REXplorer would run around the city gesturing with a device at buildings and landmarks, given more social leeway by their protected status as visitors. What separates this game from the others we examined is the strong Filtering mechanism: one had to rent the service from the tourist information office. That limited participation not only to visitors, but to visitors with enough money to spend -unlike backpackers, etc-. Agency lied mostly with the game designers and administrators since it was a closed system. REXplorer was the first application of its kind[104] and that explains to a certain degree its inflexible implementation. It did work to an extent as an urban Interface though, mainly through making visitors actively engage with the city's historical legacy. The educational elements incorporated in REXplorer and its freeform quest structure can easily be combined with more open-ended games to create multi-layered interfaces that promote urban exploration and random urban encounters.

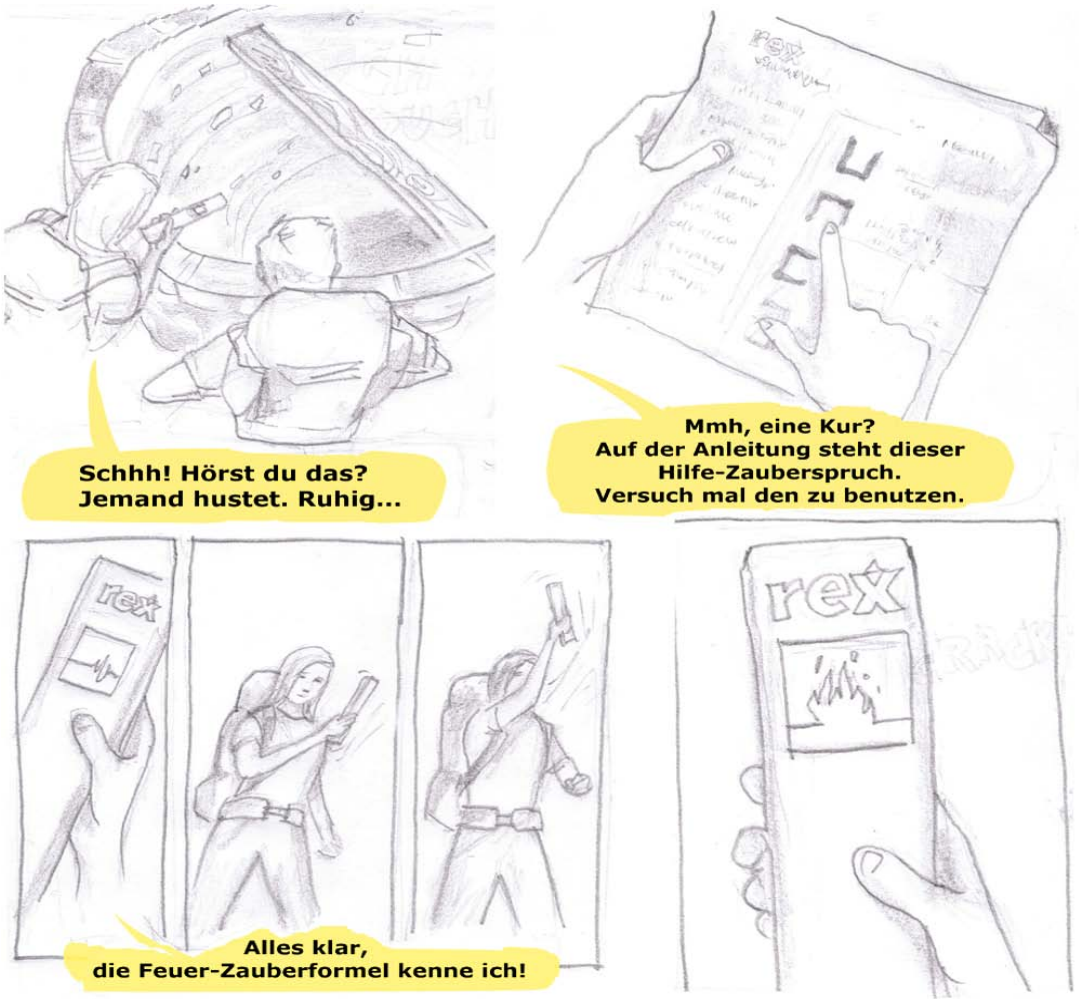

Figure 21 Original REXplorer storyboard from the University of Aachen

Figure 22 Ingress as an interface

Ingress: linked with urban landmark topology

Ingress is the most recent of the commercial pervasive games examined in this thesis. Consequently, no research papers have been published on it yet. It was released in 2012 by the startup Niantic Labs within Google. The small studio is headed by John Hanke, the person responsible for the most popular locative media app as of 2014: Google Earth. The success of Ingress and the release of the API to 3rd party developers by 2015[105] is expected to create a whole ecosystem of locative pervasive games. Ingress makes for a valuable case study as its worldwide active user base approximated one million players in August 2013.[106] The core of Ingress is simple. Players are separated in two factions, and during the course of the game they play to ensure supremacy of their chosen faction. The gameplay consists in creating 'portals' at places of public art or landmarks, iconic architecture etc. and linking them to create virtual triangular fields over extended geographic areas. The basic game mechanic revolves around conquering a portal belonging to the opposing team and then defending it against reclamation. Progress in the game is measured by the total area of these virtual geometric fields, which can both overlap and span large distances. Links between portals may range from meters to kilometers or even hundreds of kilometers in operations that require considerable logistical skills; even international fields and links are not uncommon. Ingress is enhanced narratively by an alternative reality storyline that plays out across different media during the two-year course of the game until now; in that sense it also qualifies as an 'alternative reality game'.

Spatial and temporal Pervasiveness

In terms of spatial and temporal pervasiveness, Ingress is a typical persistent-world location-based game, i.e. it has neither spatial nor temporal bounds. The game is played at all times, in real time –either in a casual and leisurely way or in an involved and driven fashion. Since there is no mechanism to discourage continuous play –such as an irreplaceable resource that is generated over time– one could keep playing actively for hours, as long as they keep moving around. It must be noted that unlike similar games that preceded it –for example DarkCities– Ingress can only be played when players move to the actual physical locations where the 'portals' are located; gameplay is rooted in physical location.

Social Pervasiveness

Out of the pervasive games examined, Ingress is probably one of the less socially pervasive ones; separation between players and non-players is quite clear and unambiguous. It is arguable, however, that due to the size of the user base and the frequency of large-scale player 'operations' in public, the game does indeed leak out of its social confines. This is more a matter of scale than a matter of design intent. Several Ingress meet-ups take the form of urban happenings where bystanders are invited to participate. The game however has two more interesting

characteristics that have the potential to create social ambiguity. Firstly, in-game 'portals' are real-world monuments submitted by the players themselves to Niantic as candidates for inclusion in the game. In other words, the developers do actively crowdsource the topography of the game by having players explore the city and expand its playable universe. Secondly, the alternative reality storyline of Ingress follows the 'this is not a game' paradigm, thus offering an immersive environment to the players who wish to partake in this game of disbelief; but it also creates real world resources such as websites and that offer no hint as to their game-related nature. For these dedicated players, Ingress is not a game and everyone is considered a participant. That however consists more of a player attitude than a true game dynamic and is relevant to all 'alternative reality' games.

Ingress as an interface

Ingress has several features that make it an interesting candidate for an urban interface; it can be argued that it forms the blueprint for a next generation of mainstream location based pervasive games. The Platform of Ingress is the physical space of the city, especially the areas around landmarks designated as 'portals'. Since there is no in-game messaging system, players can meet in urban space during real-time operations where they fight on the augmented layer over control of a landmark. However, Ingress is also an alternative reality game (ARG). Therefore, part of the community that is involved in the storyline mobilizes and coordinates through social media. Therefore, there is also a media Platform for Ingress; albeit it is used for strategizing and engaging with the interactive story ouside of the game, not for playing the game itself. The Program is a complex version of a geo-tagging game where a player has to mark geo-specific spots. It is also partly interactive narrative, acts of which are played out by participants in real world events. Protocol is harder to define in Ingress; it is a rather new game and so far participants play by the developers' rules without important signs of internal emergent behavior. Strategies that involve real-world teaming-up between several players would belong to the Protocols used within the game, but that this sort of behavior was predicted and encouraged by the developers. One possible exception is 'creeping'; by following a player's virtual activity, another player actually locates them in real space, identifies and stalks them for in-game or out-of-game purposes. This is a reported risk with many types of locative media. Cheating has also been a recurring problem within the community and is considered a fundamental threat to the game. The main cheating method is manipulating one's GPS location through software and thus turning the locative world of the game into a virtually navigable one. There are two notable points concerning cheating. Firstly, in a small-scale study involving Ingress players in January 2013:

> "16% said they had 'knowingly broken legal or local regulations in order to play Ingress' and a further 15% ominously said 'maybe'. Meanwhile 5% of players said they cheated within the game"[107]

What is remarkable is that apparently, the in-game rules elicit more respect than the actual laws dictating behavior in urban space. This is indicative of the sense of protection that people feel when playing games; Huizinga's 'magic circle' allows transgression even when it is expanded, as is the case in pervasive games. The second point to be made about cheating refers to the developers' attitude, who declare "Zero tolerance for non-official software".[108] This is not a reference to cheating per-se, but more towards unofficial user created add-ons that expand the functionality of the game; it is a clear collision of Agency between players and developers. The Filtering mechanism is similar to most of the other games analyzed; in order to participate in this experience, one needs to live in a dense enough urban environment, own a smartphone and wireless Internet access. Ingress is rather unique in this field though. By using effective marketing, it has created an impressively large player base[109], whereas many of these players play Ingress as a casual game. This is especially important, since it is opening up this new form of entertainment to social groups usually not associated with the activity of gaming.

Lastly, Agency lies primarily with developers although players play a role in shaping the story. As we discussed about Protocol though, there is an ongoing collision as player behavior becomes difficult to control by a developer team that wants to have a firm grasp over how the game is played. As an interface, Ingress works in a positively disruptive way. Social media are rife with reports of players that explored parts of their cities that they had never visited before. Commuters would take longer routes to visit larger geographical areas and the user-submitted system of 'portals' has sent a large part of the player base actively looking for obscure landmarks. It is precisely the sort of activity that sends city dwellers exploring the city and confronting parts of it that they avoided due to reasons of convenience or incompatibility. It is precisely this sort of activity that can shape up a new public sphere, as we will discuss in the conclusion.

Figure 23 The area of Shinjuku in Ingress

From the Fun Palace to Pervasive Games, generating new public realms.

The six pervasive games that we examined exhibit important differences: degree of adoption and player base; available technology at the time of their introduction, educational, commercial or purely experimental outlook; out-of-game focal element and so on. Nevertheless, the similarities between them are significant: by using available media technology to the maximum of its potential these six games played out –half of them still do– in the physical public space of the city. The introduction of game Protocols into the urban public space becomes a catalyst for social interaction in varying degrees, on a case-by-case basis. The game aspects related to education, physical exercise and sightseeing seem to be interchangeable components that do not really drive the game logic –rather, they take advantage of it in order to work. This brings us back to the Fun Palace, which was supposed to work in an interestingly similar way.

The Fun Palace as an interface

One interesting aspect of the Fun Palace that stands out when we study it as an interface, is that unlike our other examples, it was conceived and designed from the beginning as one. By calling it the 'anti-building' and its content 'anti program', Littlewood and Price emphasised their intention to create a system that would be a catalyst for interaction. De Waal's Interface theory further highlights the conceptual affinity between the Fun Palace and pervasive games. The Platform of the Fun Palace was the physical structure itself; all interaction happened inside the mobile scaffold framework. However, if we treat it like just any other physical Platform –like the sidewalk in Jane Jacobs' work– we are missing an important point: the Fun Palace was supposed to be dislocated. For Joan Littlewood, the Fun Palace should not be a destination or tied excessively to the location. Rather, it should be "accessible as a regional and national amenity."[110] while at the same time:

> "As found urban landscape is illuminated or obscured to extend the visual limits of the site. On-site activity is measured and visually displayed for long distance approach viewing." [111]

It is apparent that while the Platform was physical, there was a conscious effort to extend it into the media sphere and transcend location; this will be further explained into he next subchapter. Subsequently, the Program of the Fun Palace was supposed to be fully malleable and defined by a cybernetic system of control as we already saw; in the 1968 article that best summarised the scope and intent of the Fun Palace, Littlewood and Price described possible incarnations of the Program:

> "a laboratory of pleasure, providing room for many kinds of action [...] games and tests that psychologists and electronics engineers now devise for the service of industry or war-knowledge will be piped through jukeboxes. In the music area we shall have, by day, instruments available, free instruction, recordings for anyone, [...] There will be a 'scienceplayground' (sic) [...] An acting area will afford the therapy of theatre"[112]

The Program was a mix-use environment where leisurely play would meet education, personal expression and socialization –not unlike some of the games that we examined. It would adapt to the users' behavioural patterns but interestingly enough, that did not refer to user preferences. The Protocol was also supposed to emphasise the playful and stress-free environment of the Fun Palace. It is succinctly stated in the same 1968 text:

> "the essence of the place will be its informality: nothing is obligatory, anything goes." [113]

The designers' intention was to and re-forge characters and social relations by doing away with most societal norms. It is worth remembering at this point that at its beginning, the Fun Palace was conceived as a "university of the streets"[114] aimed at the working class with the aim to uproot class differences. Therefore the Fun Palace was, by design, socially disruptive. There was no particular Filter; in fact, conscious effort was put in order to remove all barriers to participation. During its lifetime as a pending proposal, the Fun Palace always retained its "free and open for all" status. The final component to examine is Agency; perhaps it is also the most controversial one. While the users had apparently total freedom to act within the Palace –therefore directly setting the Protocol and indirectly the Program as well–, they were not supposed to be conscious of or involved in the cybernetic control system. When Joan Littlewood described the project as "a foretaste of the pleasures of 1984"[115] she was most probably being tongue-in-cheek playful, but the fact remains: in a context of technological optimism, the impression that we get from the cybernetics committee discussions is that a group of experts would help people improve themselves. This aspect part of the Fun Palace was conceived in a strangely top-down way, perhaps –and this is of course a wholly different discussion– due to the Marxist ideology underlying Littlewoods's work at the time.

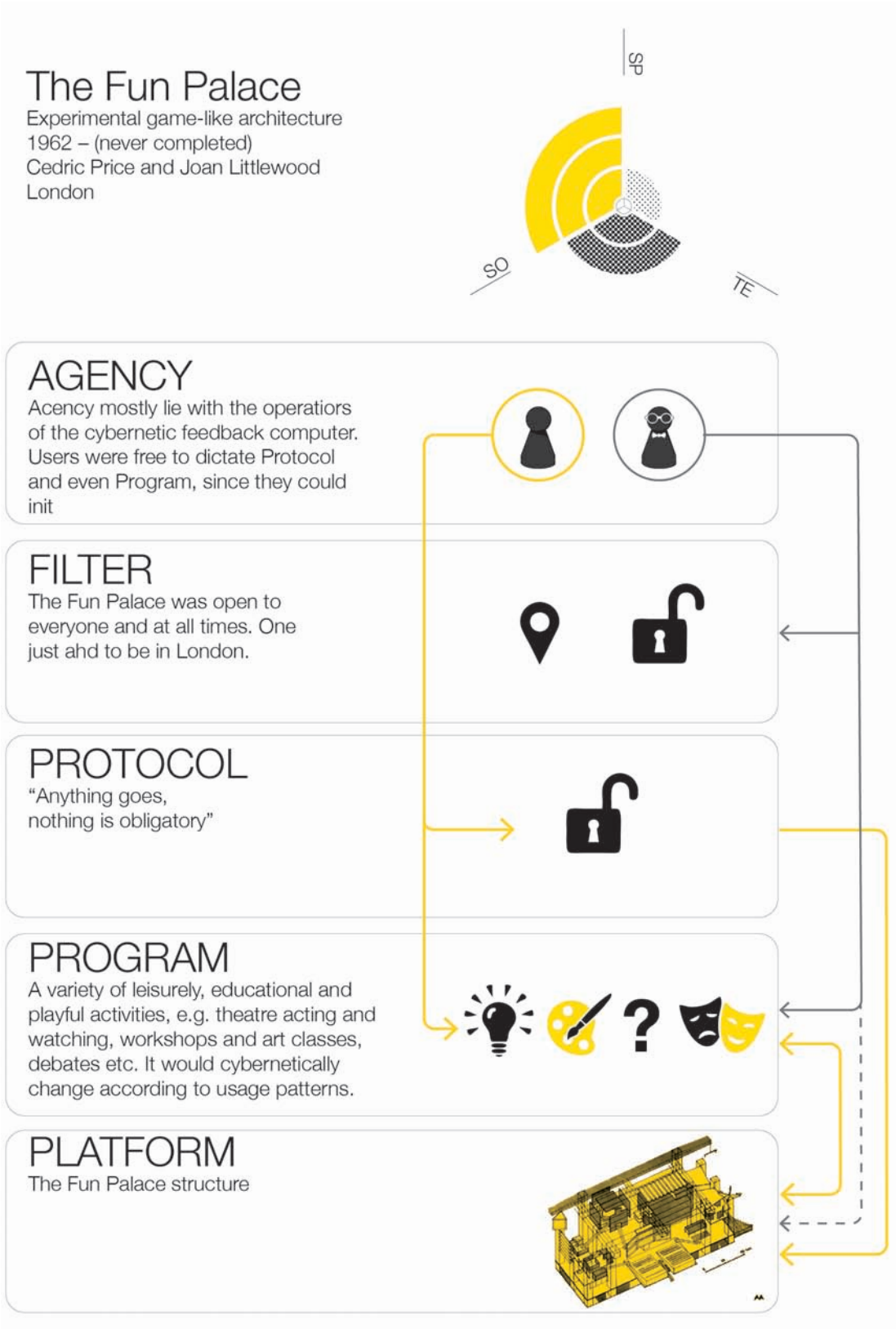

Figure 24 The Fun Palace as an interface

A Pervasive, or Ubiquitous Palace

The correspondences between the Fun Palace and the six pervasive games examined in this thesis are striking, when viewed under de Waal's theory. It also worth reversing the process and seeing the Fun Palace as a pervasive game; it is an analogy that holds surprisingly well. We have to make some assumptions since the Fun Palace was never completed, but for this research the study of intentions will suffice. At first one should ask: can the Fun Palace be described as a game at all? Huizinga's theory focused on the activity of play, leaving the difference between 'play' and 'game' largely unaddressed. Roger Caillois continued Huizinga's work though and gave a definition of games that we will use as a benchmark here. For Caillois, a game must be:

1. fun: the activity is chosen for its light-hearted character
2. separate: it is circumscribed in time and place
3. uncertain: the outcome of the activity is unforeseeable
4. non-productive: participation does not accomplish anything useful
5. governed by rules: the activity has rules that are different from everyday life
6. fictitious: it is accompanied by the awareness of a different reality[116]

The Fun Palace easily covers four out of the six points drawn by Caillois, but there are two that need further examination. The first one is the point about 'separation'. It is a direct continuation of Huizinga's concept of the 'magic circle' of play and therefore easy to sidestep; we are dealing with pervasive games which are defined by the expansion of temporal spatial and social bounds of play. This point simply does not apply to pervasive gaming. The second one is 'governed by rules'. This seems to be the more defining difference between play and games: a game is structured play, with rules and game-specific goals. The Fun Palace where, as we saw "nothing is obligatory, anything goes"[117] seems to lack any structured rule or goal set; but this is not entirely true. Seen through Pask's cybernetic control chart the Fun Palace was indeed a game, which even included checkpoints, achievements and a very specific goal: the goal was social augmentation. The main difference with more typical games is that, the players were unaware that they were playing; and this brings us to the discussion of pervasiveness. We established that the Fun Palace was a game; but was it a pervasive game?

At first it is difficult to see how one can describe a physical, located structure in terms of spatial pervasiveness; but the example of Body Movies will be useful here. The installation extended over a public square but achieved a certain amount of spatial pervasiveness, by blurring the physical boundaries of play and intruding into everyday urban activity. The Fun Palace aspired to a similar goal; instead of invading a physical space of existing urban activity, it broadcast and projected its activity around. As we saw, the physical limits of the Fun Palace would be intentionally obscured and most importantly, its position next to main

transportation arteries would make sure that it never turned into a 'destination' in itself. Rather:

> "The siting exploits existing communication networks and gives a clue to the potential enrichment of life through increasing mobility at present unrealised in large urban communities [...] The 'occasion' and 'event' would become the inevitable uses of the site"[118]

The emphasis on the 'occasion' and the 'event' as Littlewood wrote, would not only blur the spatial limits of play but also the temporal ones. One of the central arguments in the 'work versus leisure' debate was that the separation between working time and leisure is artificial; Littlewood an Price produced an urban "short life toy"[119] that blended seamlessly within the schedule of the working person, not unlike a casual pervasive mobile game. We read that:

> "The Fun Palace must also be sited so as to allow random time-usage. [...] This condition enables the use and degree of attention afforded by the public to the activities of the site to vary according to the changing scale and intensity of use of a metropolitan region"[120]

Lastly one needs to look for social pervasiveness, or whether the distinction of players and non-players was blurred. The Fun Palace was going to be, in the end, a finite structure; as such, only the ones entering it could were participate to the activities; one was either outside or inside. The Fun Palace did not display social pervasiveness of the degree that some of our case studies did –interestingly, that happened because of its spatial, not social confines. It must be noted though that once inside, for Littlewood:

> "there will be no rigid division between performers and audience –a generalization of the technique used in Theatre Workshop for many years"[121]

Therefore, the intention for the blurring of roles and inclusion of everyone was there; it is the unavoidable spatiality of the Fun Palace that did not allow for the social part of the 'magic circle of play' to expand into the lives of the passer by. Concluding this sub-chapter, it seems that the Fun Palace can indeed be viewed as a pervasive game; albeit, maybe the ultimate act of pervasiveness was that none of the players knew that they were part of the game that ran under the rule-set of Gordon Pask and the Cybernetics Committee.

Conclusion

This research began with the question of whether new forms of urban media can transform public space; especially, we focused on pervasive games since they seemed to hold the promise of fulfilling what the first media architecture –the Fun Palace– set out to accomplish. In order to understand pervasive games in a spatial context we drew upon urban anthropology and the writings of Lyn Lofland on social territories. Subsequently, in order to study the interactions produced by urban media and physical urban space alike, we applied Martijn de Waal's theory of City as an Interface on pervasive games. At the very end of the research, an inversion of our classification system –viewing the Fun Palace as a pervasive game– confirmed the initial hypothesis: pervasive games are in most respects a contemporary equivalent of Cedric Price's Fun Palace; therefore they do hold the potential to form new public domains and locate them in physical urban space. But perhaps the most important aspect of the comparison is the one dealing with political intent, as it is expressed through the concept of Agency.

The politics of leisure re-visited through Pervasive Games

From the wording used by Littlewood and Price it is apparent that they did have in mind the formation of a new Public Sphere, consisting of socially aware individuals that were 'enhanced' through the experience of the Fun Palace:

> "The curiosity that many people feel about their neighbors' lives can be satisfied instructively, [...] The visitor can enjoy a sense of identity with the world about him." [122]

Littlewood's words echo the conception of the public domain as "a republican or even libertarian urban life of familiar strangers"[123]. Especially the mention of identity seems to echo Manuel Castells who –as mentioned in the chapter on interfaces– wrote that cities are

> "based on the interface between individual and communal identities and shared social representations"[124]

It seems very likely that Littlewood, Price and Pask were trying to create the ideal interface between the individual and communal identities when they designed the Fun Palace; does that mean that pervasive games have the capacity to do the same? While this is not a question that can be fully answered yet –after all we are only at the beginning of the proliferation of pervasive gaming–, our analysis points to a positive answer. Through the three-fold expansion of Huizinga's magic circle, pervasive games have the capacity to introduce ludic attitudes into urban space and create the 'positive disruption' to which Cedric Price also aspired. By creating confrontation and unexpected situations, they can allow a

renegotiation of urban space, as city dwellers are gently pushed out of their comfort zones.

The most important lesson learned through the Fun Palace is to be found in the project's major omission: true user participation. Not only was Gordon Pask's cybernetic system designed to 'improve' people, but they would never have the chance to participate in the processing of the information that their behaviours generated. This resonates deeply with the very current question of urban data management and user Agency, or what Dan Hill describes as 'Locked Down Street' versus 'Open Source Street'[125]. On the first scenario, public space users are consumers in increasingly tailor-made services that target them personally, while on the second one, publically generated information is accessible to everyone – and so are the flow channels of this information. Martijn de Waal admits that Hill:

> "considers the contrast between Locked Down Street and Open Source Street a caricature, and aspects of both examples will probably be realized simultaneously"[126]

However, especially in this case, it is users being conscious of their Agency that will affect the direction of public data management; pervasive gaming can make urban dwellers conscious of their position within the urban media sphere. Finally, the vision of a leisure-based economy might be long gone since we are experiencing the opposite: an intensification and increase of workload, paired with higher unemployment. However, the advent of urban media has created an unprecedented situation where individuals can carry their private domains – including their magic circle of play– with them at all times. One of the side effects of smartphones that act as 'territory devices' is that the blending between work and leisure is happening increasingly through wireless social networking and casual gaming; the link back to urban space could possibly be found in this overlap –quite unlike the one that Price imagined but in effect very similar.

Today though, the Fun Palace can indeed be everywhere: in everyone's pocket, home or office, expanding their social territory and invading into urban public space. Urban media –and especially pervasive games– constitute what the title of this thesis refers to as 'The Ubiquitous Palace': a new type of urban interface and a new type of appropriation of space; albeit one that was foreseen half a century ago. What remains to be seen is whether the field of architecture can work with these new tools to create truly hybrid physical and mediated interfaces the way that Cedric Price did. Our cities amount to much more that their material components and it seems that, finally, we are in the position to not only interface between the physical and media spheres but directly affect the interface mechanism as well.

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Aris Kafantaris,

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Referenced Works

[1.] "ICT Facts and Figures 2014." *ITU*. United Nations International Telecommunications Union, 2014. Web. 22 July 2014.

[2.] Hill, Dan. "The Street as Platform." *'cityofsound'* City of Sound, 11 Feb. 2008. Web. 29 July 2014.

[3.] Singer, Natasha. "Mission Control, Built for Cities." *The New York Times*. The New York Times, 03 Mar. 2012. Web. 21 July 2014.

[4.] Olson, Parmy. "Why Google's Waze Is Trading User Data With Local Governments." *Forbes*. Forbes Magazine, 07 July 2014. Web. 21 July 2014.

[5.] Waern, Annika, Dr., Steve Benford, Prof, and Vartkes Goetcherian, Dr. "Iperg Games." *IPerG*. European Commission's IST Programme., 2005. Web. 21 July 2014.

[6.] Arsenault, Dominic. "Video Game Genre, Evolution and Innovation." *Eludamos. Journal for Computer Game Culture*. N.p., 2009. Web. 21 July 2014.

[7.] Bilandzic, Marc, and Marcus Foth. "A Review of Locative Media, Mobile and Embodied Spatial Interaction." *International Journal of Human-Computer Studies* 70.1 (2012): 66-71. Queensland University of Technology. Web.

[8.] "The Demographics of Ingress." *Simulacrum*. N.p., 23 Jan. 2013. Web. 24 July 2014.

[9.] "Body Movies." *Rafael Lozano-Hemmer*. Rafael Lozano-Hemmer, n.d. Web. 24 July 2014.

[10.] Di Simone, Andrea. "Interview with Niantic's John Hanke - DeCode Ingress." *DeCode Ingress*. N.p., 19 Aug. 2013. Web. 24 July 2014.

[11.] "Cities of the Future: Songdo, South Korea." *The Network: Cisco's Technology News Site*. Cisco, 2013. Web. 28 July 2014.

[12.] Wickre, Karen. "Celebrating #Twitter7." *Twitter Blogs*. Twitter, 21 Mar. 2013. Web. 29 July 2014.

[13.] Bertrand, Karla Z., Maya Bialik, Kawandeep Virdee, Andreas Gros, and Yaneer Bar-Yam. "Sentiment in New York City: A High Resolution Spatial and Temporal View." (n.d.): n. pag. 20 Aug. 2013. Web.

[14.] "Comparison of Lunar Module Navigation Computer with an IPhone 5." Observation Deck. N.p., n.d. Web. 28 July 2014.

[15.] "Top ARGs, with Stats." *Crossmedia Entertainment*. Web.archive.org, 20 Mar. 2006. Web.

[16.] Dockterman, Eliana. "Turkey Bans Twitter." *Time*. Time, 20 Mar. 2014. Web. 29 July 2014.

[17.] "How to Report Violations." *Twitter Help Center*. N.p., n.d. Web. 29 July 2014.

[18.] Pichler, Georg. "Interview: Higher Levels and Missions for "Ingress" Are Coming." *Derstandard.at*. N.p., 16 Nov. 2013. Web. 24 July 2014.

[19.] Waal, Martijn De. *The City as Interface: How New Media Are Changing the City*. N.p.: NAI Uitgevers/Publishers Stichting, 2014. Kindle.

[20.] Montola, Markus, Jaakko Stenros, and Annika Wærn. *Pervasive Games: Theory and Design*. Burlington, MA: Morgan Kaufmann, 2009. Print.

[21.] Mathews, J. Stanley. *From Agit-prop to Free Space: The Architecture of Cedric Price*. London: Black Dog Pub., 2007. Print.

[22.] Rogers, Richard. "The Pompidou Captured the Revolutionarybr Spirit of 1968. Richard Rogers Comments." Interview. Dezeen. N.p., 26 July 2013. Web. 28 July 2014.

[23.] Mathews, Stanley. "The Fun Palace as Virtual Architecture: Cedric Price and the Practices of Indeterminacy." *Journal of Architectural Education (1984-)* 59.3 (2006): 39-48. *JSTOR*. Web. 21 July 2014.

[24.] Aurigi, Alessandro, and Fiorella De Cindio. *Augmented Urban Spaces: Articulating the Physical and Electronic City*. Aldershot, Hampshire, England: Ashgate, 2008. Print.

[25.] Packer, Randall, and Ken Jordan. *Multimedia: From Wagner to Virtual Reality*. New York: Norton, 2001. Print.

[26.] Borries, Friedrich Von., Steffen P. Walz, Matthias Böttger, Drew Davidson, Heather Kelley, and Julian Kücklich. *Space Time Play: Computer Games, Architecture and Urbanism: The next Level*. Basel: Birkhäuser, 2007. Print.

[27.] Blascovich, Jim, and Jeremy Bailenson. *Infinite Reality: The Hidden Blueprint of Our Virtual Lives*. New York: William Morrow, 2012. Print.

[28.] Maas, Winy. *Metacity Datatown*. Rotterdam: MVRDV/010, 1999. Print.

[29.] Griffiths, Devin C. *Virtual Ascendance: Video Games and the Remaking of Reality*. N.p.: n.p., n.d. Print.

[30.] Huizinga, Johan. *Homo Ludens*. Madrid: Alianza Editorial, 1972. Print.

[31.] Rheingold, Howard. *Smart Mobs: The next Social Revolution*. Cambridge, MA: Perseus Pub., 2003. Print.

[32.] Shepard, Mark. *Sentient City: Ubiquitous Computing, Architecture, and the Future of Urban Space*. New York City: Architectural League of New York, 2011. Print.

[33.] Mitchell, William J. *City of Bits: Space, Place, and the Infobahn*. Cambridge, MA: MIT, 1995. Print.

[34.] Price, Cedric. "The Fun Palace." *The Drama Review: TDR* 12.3, Architecture/Environment (1968): 127-34. *JSTOR*. Web. 21 July 2014.

[35.] Montola, Markus. "Exploring the Edge of the Magic Circle: Defining Pervasive Games." (n.d.): n. pag. University of Tampere, 2005. Web. 22 July 2014.

[36.] Fujimoto Kenichi. *The Third Stage Paradigm: Territory Machines from the Girls' Pager Revolution to Mobile Aesthetics* in *Personal Portable Pedestrian*. Ed Mitzuko Ito, Dasiuke Okabe and Misa Matsuda. Boston: MIT Press 2006

[37.] Mitchell, William J. *Me++: The Cyborg Self and the Networked City*. Cambridge, MA: MIT, 2003. Print

[38.] Haque, Osman. "Distinguishing Concepts." *Architectural Design* 77.4 (2007): 24-31. Web.

[39.] Wiener, Norbert. Cybernetics; Or, Control and Communication in the Animal and the Machine. New York: M.I.T., 1961. Print.

[40.] Fuchs, Christian. "Twitter and Democracy: A New Public Sphere?" *Social Media: A Critical Introduction*. N.p.: n.p., n.d. N. pag. Print.

[41.] Caillois, Roger. *Man, Play, and Games*. New York: Free of Glencoe, 1961. Print.

Notes

[1] Alessandro Aurigi and Fiorella de Cindio, Augmented Urban Spaces: Articulating the Physical and Electronic City, 231.
[2] For the writer of this thesis home is Athens, Greece
[4] Japanese ideograms of Chinese origin
[5] the pulpit inside a mosque where the imam stands to deliver sermons
[6] in ancient Greece, it was "The Oracle of the Dead" by the river Acheron, where believers would go to communicate with the deceased
[7] 'gamification' has many critics among the game design industry, who consider it little more then a marketing gimmick. Game designer and critic Ian Bogost is notable among them.
8 Definition of pervasive: pervading, spread throughout
9 Montola et al., Pervasive Games Theory and Design, xx.
10 Jane Jacobs, Death and life of great American cities, 77.
[11] Kenichi Fujimoto, The Third Stage Paradigm, 10.
[12] Johan Huizinga, Homo Ludens, 13.
[13] It was called 'Sketchpad' and was part of Ivan Sutherland's PhD dissertation
[14] Unofficial data for 'The Beast', 'I love Bees' and 'Ingress'
[15] In her book 'The Public realm: Exploring the City's Quintessential Social Territory'
[16] While Lofland mainly uses the word realm, de Waal uses 'domain' in his work on interfaces

[17] Lyn Lofland, The Public realm: Exploring the City's Quintessential Social Territory, 11.
[18] Manuel Castells, The Culture of Cities in the information Age, 382.
[19] Montola et al., Pervasive Games, 12.
[20] Mirriam Webster Dictionary definition
[21] Lofland, Lyn. The Public realm: Exploring the City's Quintessential Social Territory, 10.
[22] Martijn de Waal, City as Interface, Loc 286.
[23] ibid 40.
[24] Montola et al., Pervasive Games Theory and Design, xix.
[25] Within the research community there is even discord as to whether pervasive games consist a genre, a subgenre or a completely different category of activity.
[26] actually called NASA's Mission Control Center (MCC) and bearing a striking resemblance with Mission control in Rio
[27] from NY Times interview with I.B.M. executive Banavar Guru
[28] Cities of the Future: Songdo, South Korea, Web.
[29] Interview with CBC Radio's Nora Young
[30] Anthony M. Townsend, Smart Cities, 3.
[31] the most notable one being 802.11; commonly known as WiFi
[32] Forbes, Why Google's Waze Is Trading User Data With Local Governments
[33] data from ITU (United Nations International Telecommunications Union)
[34] Martijn de Waal, City as Interface, Loc 40.
[35] Kenichi Fujimoto, The Third Stage Paradigm, 97.
[37] Howard Rheingold, Smart Mobs, 6.
[38] William Mitchell, Me++, 112.
[39] Osman Haque, Distinguishing Concepts, 30.
[40] Lyn Lofland, The Public realm: Exploring the City's Quintessential Social Territory, 11.
[41] ibid, 11.
[42] While Lofland mainly uses the word realm she explains that Albert Hunter described similar social structures by using the word 'orders'
[43] Lofland, Lyn. The Public realm: Exploring the City's Quintessential Social Territory, 11.
[44] ibid, 10.
[45] ibid, 14.
[46] As per the title of her book quoted here
[47] Martijn de Waal, City as Interface, Loc2069.
[48] Jane Jacobs, Death and life of great American cities
[49] Martijn de Waal, City as Interface, Loc 749.
[50] ibid, Loc 230.
[51] ibid, Loc 1326.
[52] Miriam Webster Dictionary
[53] Application Programming Interface (API)

[54] For example, a knob affords twisting, and perhaps pushing, while a cord affords pulling (James J. Gibbons). These are also called 'natural affordances.
[55] M. Castells, The Culture of Cities in the information Age, 382.
[56] Martijn de Waal, City as Interface, Loc 355.
[57] ibid, Loc 360.
[58] Karen Wickre, Twitter blogs, web.
[59] Bertrand et al., Sentiment in New York City, 2.
[60] Eliana Dockterman, 'Turkey Bans Twitter', web.
[61] Twitter Help center, 'How to report violations', web.
[62] Bertrand et al., Sentiment in New York, 4.
[66] Mathhews Stanley, From Agit prop to free Space, 29.
[67] ibid, 26.
[68] In 1960 he began designing a new bar for the Mostyn Hotel
[69] Littlewood Joan, Joan's Book 64.
[70] Cedric Price and Joan Littlewood, The Fun Palace marketing brochure, 1.
[71] ibid, 1.
[72] Stanley Mathhews, From Agit prop to free Space, 73.
[73] comparison of Lunar Module Navigation computer with an iPhone 5
[74] Norbert Wiener, Cybernetics: Or Control and Communication in the Animal and the Machine, title.
[75] Fun Palace Cybernetics Subcommittee Report, 1964, Cedric Price archives
[76] ibid
[77] Cedric Price and Joan Littlewood, The Fun Palace
[78] Mathhews Stanley, From Agit prop to free Space, 69.
[79] Of course we have re-purposing and re-furbishing of buildings which happens in a different time-scale. The closest thing to the Fun Palace would be theatrical sets changing within a matter of seconds. But the Fun Palace and experimental theater share common roots as we already saw.
[80] Mathhews Stanley, From Agit prop to free Space, 68.
[81] Definition of pervasive: pervading or tending to pervade, spread throughout
[82] Montola et al., Pervasive Games, 15.
[83] a college campus game called assassin
[84] Montola et al., Pervasive Games, 17.
[85] Johan Huizinga, Homo Ludens: A Study of the Play-Element in Culture 12.
[86] ibid, 10.
[87] Markus Montola Jaakko Stenros and Annika Waern, Pervasive Games, 32.
[88] ibid, 186.
[90] IPerG was an EU funded project, which ran between 2004 and 2008. According to the program's homepage: "The aim of IPerG has been the creation of entirely new game experiences, which are tightly interwoven with our everyday lives through the objects, devices and people that surround us and the places we inhabit"

[92] Conversely, Google's Android and Apple's iOS combined comprised more than 95 percent of the global smartphone OS market for the fourth quarter of 2013 according to research firm IDC.
[93] Markus Montola et al., Pervasive Games p.190
[94] Jane Jacobs, The Death and Life of Great American cities, 40.
[95] Cristiano Licoppe and Yoriko Inaba, Geolocalized Technologies, Location-Aware Communities, and Personal Territories: The Mogi Case, 5.
[96] ibid, 6.
[97] ibid, 8.
[98] 5th International Ubiquitous Summer School in Oulu
[99] It has rules, a core mechanic and a goal. Anyone can play it, but in order to advance, collaborative play is necessary.
[100] Rafael Lozano Hemmer's homepage
[101] S. McQuire, "Mobility, Cosmopolitanism and Public Space in the Media City"
[102] rented for 12 Euros
[103] unfortunately the documentation makes no mention of these social aspects and whether they took place or not
[104] University of Aachen homepage
[105] As announced at the 2014 DICE summit
[106] Andrea Di Simone, Interview with Niantic's John Hanke
[107] Simulacrum, The Demographics of Ingress
[108] Georg Pichler, Interview with Niantic's Anne Beuttenmüller
[109] The only other pervasive game to have reached similar user numbers was "I love Bees", part of a marketing campaign to promote Microsoft's Halo II game
[110] Cedric Price and Joan Littlewood, The Fun Palace, 133.
[111] ibid, 133.
[112] ibid, 130.
[113] ibid, 130.
[114] Littlewood Joan, Joan's Book 60.
[115] Cedric Price and Joan Littlewood, The Fun Palace, 130.
[116] Roger Caillois, Man Play and Games, 19.
[117] Cedric Price and Joan Littlewood, The Fun Palace, 130.
[118] ibid, 133.
[119] ibid, 129.
[120] ibid, 133.
[121] ibid, 133.
[122] ibid, 131.
[123] Martijn de Waal, City as Interface, Loc 1040.
[124] M. Castells, The Culture of Cities in the information Age, 382.
[125] Dan Hill, The Street as Platform, web.
[126] Martijn de Waal, City as Interface, Loc 3190.