Infiltrated city, augmented space: information and communication technologies, and representations of contemporary spatialities

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Augmented reality and augmented spaces have recently been linked to the widespread use of sophisticated technologies. This can also be described as the intensification of our communication skills which have been related to apparent unlimited possibilities of experimenting with and perceiving space with our bodies and minds, when connected with technological tools. However, by contrast with expanded experiences of the past at a personal level (such as in religion, magic, metaphysics or the arts), contemporary technological augmentation is becoming embedded into our daily lives to such an extent that we are starting to take this mixture of digital technologies and the built environment for granted.

In this essay, we argue that, because of this influence on our interactional capabilities, Information and Communication Technologies (ICTs) might act as catalysing forces transforming various experimental and spatial dimensions of cities and urban places. In order to capture, interpret and understand these transformations in urban spaces, places and territories, we tentatively articulate the experimental and epistemological works of two contemporary Brazilian thinkers about urban studies. Lucrecia Ferrara and Nelson Brissac Peixoto inspire our arguments with their critical views about how urban space can be understood through its various interpretations, and how perceptions of it can be stimulated through artistic provocations of disquieting feelings of strangeness.

Introduction

The intangible relationships between concrete and abstract space, and what Manovich\(^1\) calls dataspace or Castells\(^2\) calls the space of flows — data, information and all sorts of flows that, in an invisible way, are an intrinsic component of places and spaces — contribute to creating the concept of an augmented reality, or, analogously, augmented space.\(^3\) This augmentation is underpinned by the growing and imperceptible presence of Information and Communication Technologies (ICTs) in several systems and structures of urban life.

Nevertheless, augmentation of space is not exclusively based on the volume of apparatuses and techniques that we use to produce it. ICT-mediated spatial expansion or augmentation is also about acquiring new qualitative and collective dimensions. As Aurigi and De Cindio\(^4\) put it, computer scientists are ‘often surprised by unpredicted and unplanned uses and transformations of the very technologies they develop and deploy’.

In this sense, contemporary augmentation of our immediate reality, differing from such experiences in the past (based on the fact that religion, magic,
metaphysics and art have always provided means for augmenting the immediate material worlds of our existence), does not depend on specific and deliberate individual or collective beliefs. Augmentation takes place everywhere and anytime, regardless of our knowledge of what is indeed happening. It is this ‘invisibility’ and ubiquity that Duarte calls the infiltrated city: urban space infiltrated by technologies that amplify our abilities to communicate and interact, with or without our awareness of this process.

Therefore, we argue that, because of this influence on our interactional capabilities, ICTs might act as catalysing forces transforming various spatial and experimental dimensions of cities and urban places.

In this paper we shall, first, reinforce this argument based on the description of augmentation and infiltration as a contemporary urban phenomenon. In fact, we argue that the ubiquitous and pervasive characteristics of today’s ICTs are responsible for an ‘infiltration’ of these technologies within built space. Secondly, based on the work of two Brazilian scholars of urban studies, we intend to present two different epistemological categories for apprehending and comprehending such a phenomenon.

The first category, coined by Lucrecia Ferrara as the adherence of icons and signs to the urban scene, is supported by the idea of an overlap of fragmentary images of a global urban imaginary with the actual built city. This, in turn, results in an exaggerated amount of visual signs which, paradoxically, tend to blur our understanding of global and local relationships in terms of information flows and their interference with daily urban dynamics (for instance, the use of high technologies as a sort of urban make-up resulting in an illusion of modernity, rather than a real transformation of space).

A second possible approach or category is borrowed from Nelson Brissac Peixoto who believes that transformations in urban space and place, regardless of scale and invisibility, can be made visible, tangible and noticeable in the eyes of the general public through some dramatic artistic interventions, intended to provoke a sort of disquieting feeling of strangeness.

In the third and last part of this paper, we try to interconnect these categories as common aspects or representations of the same phenomenon as a means to consolidate our original argument about the infiltration and augmentation of cities and space.

In order to discuss these two categories, we agree with the principle that any phenomenon is only apprehended and assessed through its various representations. According to Lucrecia Ferrara:

Knowledge is built into the construction of language. The exercise of knowledge is connected to the languages available for the reflexive game of reasoning, which means that language is another name for the essential mediation of what we know as the world.¹

**Infiltration and augmentation: cities and technologies**

It may be clear by now that our argument is underpinned by the idea that ICTs have some sort of influence upon transformations in contemporary urban territories. In this sense, it can be argued that technology makes politics. But, as Bruno Latour puts it, technological artefacts are not neutral, in the sense...
that their use can influence many economic, political, social and cultural aspects of contemporary urban society.

But if artefacts do more than ‘objectifying’ some earlier political scheme, if their design is full of unexpected consequences, (...) they do much more than carrying out power and domination and are also offering permissions, possibilities, affordances, it means that they are doing politics. They are a material assemblage in dire need of an assembly.8

A simple way of looking at this simultaneous influential and unintended rôle of technologies comes from the transformations triggered by television in our lives from the mid-twentieth century. The inclusion of TV sets in the living room has changed domestic life in the past century more than any architectural design. And yet, the striking significance of this kind of influence stems from the fact that television was never conceived with the intention of transforming domestic space. Thus, in agreeing with Latour and other Social Construction of Technologies (SCOT) theorists, we believe that technologies — and in particular ICTs — are becoming increasingly (unintentionally) influential in urban life, at the same time as they become smaller, more invisible and more infiltrated into the built environment that surrounds us. This idea of ICTs as a socially constructed set of artefacts is central to understanding our arguments about infiltrated technologies and augmented spaces.

In this sense, SCOT is important because it demystifies the idea of aseptic technologies, of technical elements without more important and intrinsic rôles in society. The idea is that of technologies or a set of technologies (or ‘artefacts’ as they are called by Hughes and Pinch9) with a range of complex social, economic, political and cultural rôles, that is to say, a socially constructed development of a certain technology.

Our technologies mirror our societies. They reproduce and embody the complex interplay of professional, technical, economic, and political factors.10

In other words, introducing new technologies to be absorbed by society implies considering all sorts of interactions and manoeuvres by what Bijker (1987) calls ‘relevant social groups’, so that these technologies might occupy their space in time (in terms of practical use). Yet, considering the relevant groups and their respective moves during the development of a certain set of technologies, Dutton and Guthrie (1991) defend the idea of an ‘ecology of games’ between the different actors, involving distinct objectives and motivations, such that we come back to Latour’s argument that technologies make politics.

One approach to research on the political construction of technology is to view technology as ‘the result of a series of games participated in by the various organizational actors’ (Crozier and Frieberg, 1980: p.57), or what Long (1958) referred to as the outcome of an ‘ecology of games’.11

A city infiltrated by information and communication technologies calls for epistemological and sensorial changes to urban experience, evidencing a radical transformation in what is understood and experienced as city. ICTs have been represented and interpreted as the most pervasive and ubiquitous
set of technologies ever. Everything tends to have a microchip as part of its structure (from aeroplanes and computers to refrigerators: and even the human body).

To name this symbiosis between electronic and traditional elements Mark Weiser coined the term ‘ubiquitous computing’, which profoundly diverges from the well-known idea of virtual reality. The difference is a significant one, in that ‘ubiquitous computing’ articulates this incredible pervasiveness and power of ICTs of ‘melting into air’, infiltrating in and blending with other aspects of our daily lives.

There will be profound ideological significance in the architectural recombinations that follow from electronic dissolution of traditional building types and of spatial and temporal patterns. This phenomenon must not be understood just as the proliferation of privileged hotspots densely saturated with information and accessed only by what Dordick, Bradley and Narris call ‘information users’. Built space is becoming the complex result of the symbiosis between bricks and mortar and hardware and software components, as will be the interactions between people and space, and amongst people themselves. ICTs tend to be invisible as regards both their infrastructure and their application. In terms of infrastructure, we scarcely have the opportunity to see and to perceive systems like fibre optics, cables, radio signals, microwaves, satellites and mobile facilities. The same applies to applications of ICTs which are usually taken for granted such as the development of communications systems, the augmentation of methods of interaction and the improvements in information and services delivery through electronic means.

Our challenge is to assimilate the hybrid way in which the universes of ICTs and urban life are melting together with or without our consent. In other words, this is the only possible way of facing the epistemological challenges of fully understanding contemporary global urban reality. Instead of the comfortable intellectual assumption about the possible mushrooming of virtual niches, what we have, and what scholars are called upon to think through, are the infiltrated city and the augmented space.

These must be seen as a consequence of the coexistence of physical and digital spaces, of traditional and electronic urban elements. The notion of space has already crossed the frontiers of physical territory by considering space as a social by-product. In addition, this notion now has to incorporate the complexity of virtual, remote and distant interactions along with cyberspace. This immediately affects perceptions and concepts of space and time, as the two start to converge into one single entity (Fig. 1):

Traditionally architecture was place-bound, linked to a condition of experience. Today, mediated environments challenge the givens of classical time, the time of experience [...] Architecture can no longer be bound by the static conditions of space and place, here and there. However, from the mid-twentieth century, the practice of planning has been too much attached to industrial ideas of space and cities. The bases for urban planning have a strong relationship to modernism and the industrial city. As new notions of space and time have influenced every aspect of contemporary society, perhaps they should likewise
influence the way in which urban space is governed and planned. Places may nowadays be functioning in different ways within and between cities, but planners are still using concepts, methods and policy instruments developed during and for the modernist period of industrial cities.¹⁶

In a certain way, what we have is the paradoxical coexistence of the rapid, instantaneous and immaterial aspects of global informational flows, with slow, place-bound, ground and materialised places. This dichotomy between instantaneous and slow spaces was critically described, more then 10 years ago, by Arthur and Marilouise Kroker in their Digital Delirium, as: ‘Fast economy, but slow works. Fast images, but slow eyes. [...] Fast media, but slow communication. Fast talk, but no thinking.’¹⁷

However, this informational world is already embedded in the routine of our daily lives: from cable TV in the living room to the Internet in the
bedroom; from international bank transfers to hotspots in airports and cafés, with networks arraying extensive territories, pushing mobility and ubiquity to their extreme. Therefore, this conflictive relationship between global instant mobility and local ‘immobility’ defines the way in which space is being challenged in the contemporary urban world.

In this hybrid space Peter Weibel\textsuperscript{18} sees an era influenced by the ‘demonic trauma of Maxwell’, when intelligent beings and/or objects interfere in the real world: these being virtual particles of architecture responsible for critical moments in the relationships between humans, the environment and technologies. Nevertheless, according to Selim Koder,\textsuperscript{19} once inserted in the real world, these virtual particles would not lead us to chaos, but open possibilities in terms of new organisations of information systems and cities. Koder’s considerations gain relevance if we consider the original definition of the word virtuality, from the Greek \textit{virtus}, which means strength, power (Fig. 2).

Thus, let us forget about technological apparatuses. Considering the infiltrated city and augmented spaces from the point of view of technological artefacts would limit their own definitions and existence, taking them just as neutral bearer elements of transformations. As we have been arguing, technologies have no intrinsic meanings, but are defined by the economic, political, social and cultural relationships within the context that they belong to. In other words, there is no way of understanding technological apparatuses and, consequently, their influence on the way that we comprehend and use urban space, outside the context of their appropriations by society, without considering them as a product of relationships that are socially and historically constructed.

The understanding of the influence of ICTs upon urban territorialities is intrinsically dependent on the signs produced by the ways in which we use technologies and experience space. According to the Czech-Brazilian philosopher Vílém Flusser,\textsuperscript{20} signs (or representations) here might not be seen simply as facsimiles of a certain reality, but as something in between, or something that allows a reciprocal relationship between humans and their context (reality): and it is only through these signs that an epistemological approach to this reality is possible.

Therefore, the discussion about the infiltrated city and augmented spaces depends upon the apprehension and comprehension of the signs produced in this new urban context. It depends on the interpretations of the images attached and overlapped to what is, in fact, happening. In order to provide instruments for such apprehension, comprehension and interpretation, we take the work of two contemporary Brazilian thinkers, whose aims, for the last two decades, have been the building of conceptual and methodological strategies to understand contemporary urban life through the lens of its representations.

Both Lucrécia Ferrara and Nelson Brissac Peixoto have the city of São Paulo as their common object; an 11-million-inhabitants metropolis in Brazil. But neither of them uses the city as a case study. There are no data collection, surveys, sociological analysis or whatsoever in their work. As an example of a global urban phenomenon, São Paulo is not there to be explained. Quite the opposite, it seems that
in these scholars’ views, the city is there to stimulate epistemological doubts, to challenge the ideas we might have of a global city on the outskirts of the globalised world.

Ferrara’s concerns, since her early works, are about how people represent the urban environment in which they live. Over the years, she has indicated that the representations of ordinary spaces and places are intrinsically articulated with a global imaginary. The glossy outcomes of this global imaginary adhere to the surface of the city and create an illusion of a global urban environment.

And this adherence is partly supported by technological apparatuses which infiltrate the city (pervasively and ubiquitously) and create augmented urban realities. The question underlying Ferrara’s recent works is at which point is this adherence in itself a sign of the global environment or, on the contrary, is it just a glossy mask that hinders access to the complexity of such an urban environment permeated by global technologies and signs.

We regard Nelson Brissac Peixoto as a ‘field philosopher’. He has also been interested, for more than two decades now, in how the introduction of
technological apparatuses transforms the urban environment and how this changes the way in which people perceive this environment. In the early years, his works were philosophical in a strict sense: based on and proposing deep theoretical articulations. But, not coincidently, his referential philosopher was Walter Benjamin. 21 Despite the importance of his early texts, Peixoto’s works became more important during the 1980s and 1990s, with a series of art interventions in public places.

Peixoto chose an area in São Paulo that had been shaped under the influence of some traditional technologies (such as railways), and that became (symbolically) invisible to most people in the city: even if these technologies are essential to an understanding of the very existence of this area. To make these technologies sensorially and mentally visible again, Peixoto invited visual artists, dancers, musicians and media artists amongst others, to make their artistic interventions in this area. It was as if these artists were stimulating or provoking physical reactions in order to represent their own experience of the area. Ultimately, this recreation of their experience would make the place alive and meaningful again for an audience partially constituted by people who already lived there, but had never bothered to ‘feel the place’.

We believe that Ferrara and Peixoto’s challenges to the appropriation of urban spaces by contemporary technical-scientific-informational society might help us to shed some light on the field of interplay between urban studies and new technologies — commonly referred to as urban technology — a phenomenon which is still far from being fully comprehended, especially insofar as it relates to ICTs and their influence on our perceptions of place. In this article, Ferrara’s work inspired us to question how crucial are the images of a global technological imaginary — overlapped with or adherent to the physical city — to the understanding of what we are calling infiltrated city and augmented spaces. Peixoto’s work, on the other hand, is important for its strategy: the intention of provoking a disquieting feeling of strangeness to unveil different possible hidden representations, through which this phenomenon could also be understood.

Adherences: urban images of a global imaginary

The connection between the transformations of our urban world under the influence of ICTs and the rise of economic, cultural and social global networks is almost inevitable. However, the formation of global economic hubs is not homogeneous across the whole planet. 22 Different spatial configurations mean distinct degrees of economic, political, technical and scientific developments in each locale, in spite of their scale (local, national or global). The Brazilian geographer Milton Santos 23 called luminous zones those with a high level of development and easily articulated with other similar zones around the world. Meanwhile, he calls opaque zones those less developed in terms of their links and articulations with other places and regions, presenting various degrees of dependence with the luminous zones.

As contradictory as it may seen, there are just a few places in the world that can be named global cities: in the sense that just a few cities and regional centres are able to exercise control over the
economic, political and cultural flows which influence the way space and society are organised. But all places are parts of a globalised society: even the most remote corners of the world (or opaque zones) are under the influence of these global dynamics, whether or not they are aware of it.

The flows and all kinds of relationships (material and immaterial) that shape spaces and societies incessantly produce signs that intentionally promote the idea of a global interconnected society: or the dream of ‘anything, anytime, anywhere’. These signs of an alleged global identity tend to disseminate a set of rules, beliefs and technologies which are the support and conditions for the very existence of what can be recognised as a global market. As if these signs were spreading a general message saying: ‘you are part of global society too’.

Calos Garciás Vázquez, borrowing Jean Baudrillard’s idea of dystopia, argues that there is a production of ‘signs that make reference to nothing […] elements whose function is to send and receive signals which transmit codes imposing a model of behaviour’. Vasquez goes on to state that since the advent of television, electronic images:

[...] transform the city into a flow of images without any spatial or temporal relation among them, since all are sent at once. The boundaries disappear and the urban space submerge in a continuum, while time is reduced to compulsive repetitions [...] These new ways of perception begin a process of dematerialisation which leads to the disappearance of the city. The urban reality is collected in an unstable manner, increasingly less defined by architecture and rather defined by the ephemeral images to which urban facts are reduced. This dystopian view seems to offer a certain resistance against an alleged homogeneous global society. But it could also be seen as a desperate criticism with no new conceptual instruments. Arguments like ‘the boundaries disappear’, or ‘time is reduced to compulsive repetitions’, or about ‘the disappearance of the city’ are just reproducing the discourse widely used by the so-called global powers. One of the possibilities of responding to these arguments as a counter-discourse has been through a general claim that architecture and the ‘values’ of real physical spaces could restore the sense of place. This kind of nostalgia seems to consider space and architecture as inanimate elements and empty containers, rather than as parts of cultural, social, economic, political and technological contexts.

In order to understand the transformations influenced by ICTs, redefining the classic paradigms of space, Gillespie and Williams highlight the differences between these technologies and former advances in transport and communication:

The idea of telecommunications as ‘distance-shrinking’ makes it analogous to other transport and communications improvements. However, in so doing the idea fails to capture the essential essence of advanced telecommunications, which is not to reduce the ‘friction of distance’ but to render it entirely meaningless. When the time taken to communicate over 10,000 miles is indistinguishable from the time taken to communicate over 1 mile, then ‘time-space’ convergence has
taken place at a fairly profound scale. Because all geographical models and our contemporary understanding of geographical relationships are based, implicitly or explicitly, on the existence of the friction imposed by distance, then it follows that the denial of any such friction brings into question the very basis of geography that we take for granted.

Contemporary urban spaces are permeated by a multitude of electronic images attached to the built environment in many forms. They are on advertisement hoardings, neon signs and urban screens, to name but a few, and function as a sort of immediate connection with a global imaginary as modern(ised) places. The simple fact of having these images as part of architecture, means that a certain place is modern, linked to the most recent cultural and economic global trends (Fig. 3).

Thus, one difficult challenge is to interpret the city underneath those technological images and signs. A first impulse would be to try to remove these glossy masks to unveil the ‘real city’. However, then we need to question if there is such a thing as a city with an original autonomous identity that has been suffocated by different kinds of false images. Honestly, we do not believe so.

There is no way of thinking the great contemporary cities without understanding them within a cultural and economic global context: companies act globally, some people consume, others work and information circulates globally. Lucrècia Ferrara writes that ‘there are moments in the life of a city when images seem to capture urban indicators not fully visible but imminent, representing a reality about to break out, a sort of social momentum.’

The concept of landscape, derived from geography, might help us to understand the idea of urban spaces represented by the overlapping of images of a global imaginary. In geography, landscape is seen as the capture of an instant moment of space, or the crystallisation of space. Like a photograph, landscape denounces the ingredients of many different ages in human history that make space. It reveals, when carefully analysed, the continuous process of the creation and recreation of space: which is, according to Milton Santos, an indissociable conjunct of systems of objects and systems of actions.

Since space is essentially mutable, and its apprehension is based on the representations of a certain set of its ‘phenomenic fragments’, it seems naïf to regret the loss of the real city which would be covered by the masks of the technological images of a global culture. As Pieter Versteegh puts it, ‘the self-identification with direct reference to a geographical context is gradually replaced by insertions in global interactions and selective networks. The result is a new social condition.’

Instead of being nostalgic and seeking the return of some past cultural sense of place made possible by an alleged glorious architecture, we should be asking: ‘if the built environment disintegrates and information becomes its sign, how will the visual semiotics of the virtual city be written?’ A first possible way of looking into the answers to this question comes from the recognition that urban space and cities are made of various heterogeneous elements: places, or portions of space immersed in the anonymous dynamics of daily life where there are ‘ruptures and unexpected situations indicating
how a city is supposed to be [...] Places of the city are not likely to be built, but produced without plans or forecasts.’ (Fig. 4).  

What seems to be important for us in Ferrara’s methodology of apprehending and comprehending urban spaces under the influence of a myriad of juxtaposed technological images is that she does not try to analyse this phenomenon based on these images, or try to eliminate these images in an attempt to reveal the city: as if those images were just veiling something as the real city. The challenge is even harder: Ferrara tries to read this urban phenomenon based on the multiple representations made by its citizens. It is interesting to see that from her early studies to the more recent ones, the intimate relationships between an actual place and its representations produced by people who experience them, have faded out.

These perceptual transformations were evident in some experiences with residents and passers-by carried out by Ferrara in different places in São Paulo during more than twenty years. While the representations of São Paulo’s main square produced by nearby residents and passers-by in the 1970s make references mainly to its concrete physical characteristics, during the 1990s people’s representations...
of another portion of the city (a famous business district) were largely related to the imaginary of São Paulo as a global node (as portrayed at that time by a national soap opera). Today, these representations evoke references to a global urban imaginary. 

This interchange of local and global references to represent specific places in the city, creates a massive variety of complexities and heterogeneities — what Lebbeus Woods called heterarchitecture, in order to counteract any kind of homogeneity and hierarchical order — both of a global glossy one, but also an idealised (and non-existent) one. For Ferrara, the metropolis becomes an ‘overwhelming display-window of forms and materials, images and non-experienced but consumed imaginary realities’. 

This strategy of reading or interpreting contemporary cities intertwined by technological images clearly states that urban dynamics cannot be
In this sense, there should be no rejection of the overlapping of images that mushrooms across cities, connecting them to an imaginary of global symbolic values, since they are constituent parts of contemporary urban environments under the influence of ICTs.

Provisons: representing the infiltrated city

Reality is only apprehensible when mediated by signs. Signs are part of specific systems of representation. The words ‘city’, ‘ville’, or ‘stadt’ are used to represent the same object. But as Vilém Flusser puts it, an object is what it is, only within a specific system of representations; and in any translation (when two systems of representations are used), different aspects of the same object can arise. Expanding Flusser’s idea, it seems to be clear that, depending on the signs (representations) attributed to an object, the perception of this object changes and reveals multiple aspects of itself.

Urban space is a complex phenomenon, and a possible way of reading its complexity would be to provoke multiple representations of the city in order to reveal its different characteristics, usually through art works and architecture. The main idea is to make the city visible and noticeable through the stimulation of a certain disquieting feeling of strangeness.

From his early works, Nelson Brissac Peixoto has been trying to unveil cities’ complexities by overlapping and juxtaposing different representations to the same object. Peixoto uses the strategy of a foreigner’s view as the one who, from within a distinct cultural background — hence using different systems of representations — could stimulate new perceptions about the city, unveiling aspects normally invisible to the accustomed eyes of ordinary users (residents, passers-by, etc.).

In 1994, Peixoto changed his strategy for looking at the city. Instead of a reflexive work — even though still based on stimulating critical perspectives — he decided to become more directly and physically involved with his object (urban space) in order to try to stimulate multiple views of the city, revealing possible facets of its complexity. Peixoto conceived, in collaboration with the art critic Agnaldo Farias, a series of artistic interventions in urban fragments named Arte/Cidade.

The first of three projects was called city without windows, in which fifteen artists were invited to perform interventions in an abandoned slaughterhouse in São Paulo. Photographers, dancers and composers were among the artists. The interventions were intended to work with the building itself and to be inspired by its characteristics. In Peixoto’s words, the building was ‘a space deprived of memory, whose sole remains are the factory structure and the mechanical residues of a forgotten activity’.

The intention was to provoke the building and stimulate new possible representations, in order to return an abandoned building to the city. According to Agnaldo Farias, ‘each one of the works exhibited incorporates elements present in the city, and utilises them as part of the language they employ’.

In the same year, a second project of the Arte/Cidade series was launched and called the city and its fluxes. Peixoto chose three historical buildings
in the centre of São Paulo, interconnected by a central motorway built over a river (as are many in São Paulo), and converted into a huge square only a few years before this artistic project was put in place. This time he invited twenty artists with the same purpose: perform interventions in the city, stimulated by the city itself, with the objective of showing its different aspects.

The main difference with the first project was of physical scale: from an architectural object to interconnected buildings in an urban context. Peixoto argued that ‘now, the individual is not the measure of things anymore. Scales have changed, and they are not proportional to the human scale [...] Working with dimensions we cannot cope with anymore. A situation opposed to the controlled environment in museums: here art is deliberately put at risk, in precarious positions.’

Finally, in 1997, Peixoto carried out the third project of the Arte/Cidade series, named the city and its stories. This time, the scale was even bigger, almost reaching a metropolitan level. Three different buildings in the city of São Paulo were chosen, all of them part of its industrial history: two being abandoned. Thus, the first Arte/Cidade was focused on a single building; the second on a group of buildings surrounding a huge square: but still walkable. For the third project, however, the only possibility of going from one building to the other was by train. In fact, the railway was incorporated into the project. Visitors could depart from any of the three buildings and reach the other two only by train (Fig. 5).

Art works were spread all over the three buildings and on the train: inside and out. Thirty-two artists were invited to read the sites, to be stimulated by them and to propose interventions that would unmask this urban context to visitors: an urban context veiled by abandonment. When the city is not used, it is not represented and, consequently, it disappears from our perception. Film makers, video artists, composers and architects were called upon to propose new representations for these urban fragments and, so, make them alive again (Fig. 6).

In analysing the Arte/Cidade series after the completion of the three projects Peixoto indicated what seemed to him as an evolutionary characteristic of these interventions: ‘The works of art tend more and more to appraise the places, the architectural insertion, the urban scale, the complexity of circumstances.’

The intention of Peixoto with this strategy of reading the complexity of the city through very emblematic buildings and sites was to provoke the emergence of its multiple signs. From the slaughterhouse in the first intervention, to the railway context chosen for the last project of the series, it is interesting to see how urban spaces influenced by technological infrastructures were increasingly attracting attention in the course of his works. In the second project, the city and its fluxes, an important urban motorway was the articulation between the buildings. In the third project, the three chosen sites linked by the railway were, symptomatically: São Paulo’s central station, once important for connecting industrial production with the seaport in Santos (Latin America’s biggest port), and two other industrial buildings of great importance to the city’s industrial history.
Figure 5. Nelson Brissac Peixoto, Arte/Cidade, industrial area of São Paulo (source: www.artecidade.org.br).
Figure 6. Lucas Bambozzi, traffic and violent scenes of the city projected on the walls of Mattarazzo industry, São Paulo (source: www.artecidade.org.br).
After *Arte/Cidade*, Peixoto was still involved as a curator in some other artistic projects in São Paulo, based on the same principles: urban spaces influenced by technological infrastructures, masked by some kind of abandonment, which could regain importance (even if for a moment) when stimulated by possible and provoked new representations.

More recently, Peixoto's perspective changed again: the influence of technological infrastructures, including ICTs, on a huge scale was felt to be determinant of regional configurations, both spatial and political – but even managerial.

The project, called *MG/ES*, developed between 2004 and 2006, focused on a 98,330 square kilometres area involving 237 municipalities distributed across the states of Minas Gerais and Espírito Santo, in the Southeast of Brazil. The conceptual starting point of the project was the consideration that this interstate region is territorially structured and even managed as a whole in spite of state administrative borders.

This über territoriality derives originally from the steel and iron mining industry, with companies like Vale, Acesita, Usiminas and Cenibra as the main actors in regional socioeconomic development, with a significant historical importance for the region. It is striking to see how these industries’ huge installed infrastructure (from railways to ICTs) completely influences the organisation of the territory while exclusively serving the private sector. This represents an infrastructure which is at the same time infiltrated to the interstate territory as well as disconnected from it, as it serves not the immediate dwellers of the region but the global links of the private companies. In Peixoto own words:

> The mine-railroad-port device, although keeping its physical infrastructure, is converted into a more complex and extended logistic network [...] The region is not a closed block anymore, starting to function in an interdependent way, part of the global production network, a platform for the production and exportation of national and multinational corporations. A dynamic field of forces, with changeable configuration.

Different from the *Arte/Cidade* series, the chosen area is now fully alive. Ideas as ruined buildings, or abandoned urban spaces and infrastructures could not be used in the *MG/ES* project. Nonetheless, the anguish of representation was there: how to understand these large territorial dynamics? As we have been arguing from the beginning of this paper, an object has as many facets and interpretations as different ways of representing it. The ordinary economic or demographic modes of representation, frequently used to analyse large regional territories are the same instruments used by the private sector actors that exercise control over the infrastructures and regions. Once again, what Peixoto tried to accomplish with his cultural provocations was to stimulate new ways of representing space in order to understand it in its complexity.

This time, instead of artists, Peixoto invited architects, engineers, computer scientists and GIS specialists to read the territory and represent it in the ways they found more appropriate. After ordinary socioeconomic analyses, the invited professionals tried to produce cognitive diagrams for the region.
The idea of using diagrams as a cognitive model was inspired by an overall perception that:

This productive and spatial restructuring also allows new configurations, flexible and mutant, to appear. A complex topology, where local conditions are linked with globalised space, producing interstitial zones, intervals, new territories. Peixoto believes that the importance of using diagrams comes from the fact that:

Detached from the original context, these dynamics can be deviated or inverted, combined or applied in other situations, according to different logics. These processes can then be instrumentalised, transformed into strategies or tactics of intervention in the territory. They become operators.

If the MG/ES project does not have the artistic appeal of the Arte/Cidade series, and it cannot be visited or experienced as a whole, the reading process made possible through the diagrams, was an intellectual tool to represent and understand a contemporary territorial phenomenon underpinned by global technological infrastructures. Therefore, we can trace back our arguments here and argue that this experience reveals parts of an augmented space, supported by infiltrated technologies that organise an interstate territory in the middle of Brazil.

**Final considerations**

This paper stands on the assumption that the widespread use of sophisticated technologies has resulted in an expansion of what we define as urban space. Contemporary urban space is intertwined by all sorts of data, information and signs which flow through ICTs’ apparatuses, creating what has been called augmented space. This augmented space, based on invisible and ubiquitous technologies, brings unlimited possibilities of perceiving and experimenting with urban realities.

Many papers have been written presenting case studies based on the same arguments. What we have tried to argue here is that the understanding of this augmented urban reality depends on the systems of representations used to interpret and apprehend it. As a new phenomenon, augmented spaces supported by infiltrated technologies, brings a sort of anxiety concerning the many possible heterogeneous representations of urban spatial dynamics.

When it comes to extreme situations of representation, one of our first intuitive reactions is to overlap excessive interpretations of an object, in order to attribute signs to each perceived nuance of this object. This is as if we wanted to access the phenomenon through its absolute description: just as in Jorge Luis Borges’ tale, where the school of cartographers was looking for a map that was so perfect, that the whole territory was overlapped in its minimum details, turning the representation into a useless piece:

[
... In that empire, the art of cartography attained such perfection that the map of a single province occupied the entirety of a city, and the map of the empire, the entirety of a province. In time, those unconscionable maps no longer satisfied, and the cartographers’ guilds struck a map of the empire whose size was that of the empire, and which coincided point for point with it. The following generations, who


were not so fond of the study of cartography as their forebears had been, saw that that vast map was useless, and not without some pitilessness was it, that they delivered it up to the inclemencies of sun and winters. In the deserts of the west, still today, there are tattered ruins of that map, inhabited by animals and beggars; in all the land there is no other relic of the disciplines of geography.57

Perhaps, diagrammatic readings overlapped to maps do not yet sustain a necessary representational system to deal with new territorialities.58

In this paper we have discussed the works of two Brazilian thinkers who, for the last twenty years, have been trying to understand the changes in urban spaces influenced by technological infrastructures, with especial attention to how to represent these transformations. The common theme of their works is the belief that over-descriptive approaches (like some case studies) are not enough to understand the phenomenon of augmented spaces. For them, the possible systems of representations used to apprehend a phenomenon are an essential part of its very understanding.

Peixoto has been dealing with urban spaces transformed by technological infrastructures, from railways to ICTs. He works mainly with urban spaces that, despite being deeply influenced by technologies in their form and original functions, have been forgotten in some sort of urban and architectural state of abandonment. Promoting artistic interventions in order to stimulate both artists and visitors to see what seems invisible, he tries to unveil parts of the city and to provoke the apprehension and understanding of these places.

Ferrara follows another strategy. On the one hand, it seems that she also tries to unveil spaces transformed by the flows of signs that overlap the city, mainly influenced by ICTs. On the other hand, in her case, these spaces are very much alive and rather visible, covered by a profusion of images or signs, the challenge being the reading of the city despite all its possible masks.

Therefore, we believe that the contribution of Peixoto’s art works and Ferrara’s efforts to understand and apprehend urban space through its multiple and indissociable natures, stems from the urge to question the current ways of territorial ‘reading’ and the need to build innovative ways of representation as a real possibility to approach a dynamic re-composition of spaces, places and territories articulated and influenced by information technologies at many different scales.

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Notes and references
5. F. Duarte, ‘La ciudad infiltrada’, *Café de las ciudades*, año 3, número 23 (September, 2004).
6. L. Ferrara, *Design em espaços* (São Paulo, Rosari, 2003), p.37. Translated by the authors from the original in Portuguese: ‘o pensamento se constrói na construção da linguagem. Nosso exercício de conhecimento está ligado às linguagens de que dispomos para o exercício do jogo reflexivo da razão, ou seja, linguagem é outro nome para a mediação indispensável ao conhecimento do mundo’.

17. A. Kroker and M. Kroker, *Digital Delirium* (Montreal, New World Perspectives, 1997).
27. Both passages have been translated by the authors from the original in Spanish: ‘[...] transforma la ciudad en un fluido de imágenes sin relación espacial o temporal entre ellas, ya que se emiten todas a la vez. Los límites desaparecen y los espacios urbanos se sumergen en un continuum, mientras que el tiempo se reduce a repeticiones compulsivas [...] Estos nuevos modos de percepción ponen en marcha un proceso de desmaterialización que conduce a la desaparición de la ciudad. La realidad urbana es captada de una manera cada vez más inestable, cada vez menos definida por la arquitectura y más por lo efímero de las imágenes a las que reducimos los hechos urbanos’.

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31. L. Ferrara, Os significados urbanos (São Paulo, Edusp; FAPESP, 2000).


34. L. Ferrara, Design em espaços (São Paulo, Rosari, 2003).

35. Ibid.


38. L. Ferrara, Os significados urbanos, op. cit.


42. V. Flusser, Língua e realidade (São Paulo, Annablume, 2004).


44. N. B. Peixoto, city without windows (1994): an English overview can be seen at www.pucsp.br/artecidade/ac1prehome_en.htm

45. N. B. Peixoto, ‘Enclosedcity’: this can be read at www.pucsp.br/artecidade/novo/ac1/20i.htm.

46. A. Farias, ‘Arte/Cidade’: this can be read at www.pucsp.br/artecidade/novo/ac1/20.html#Arte

47. Peixoto has also called it ‘the city and its networks’: an overview of the project can be seen at www.pucsp.br/artecidade/ac2prehome_en.htm

48. N. B. Peixoto, ‘The city and its networks’: this can be read at www.pucsp.br/artecidade/novo/ac2/30.htm

49. An overview of the Project can be seen at www.pucsp.br/artecidade/site97_99/ac3/index.html

50. The theme of the ruins of the city has always been present in Peixoto’s works, from his early books, such as Cenários em ruínas (São Paulo, Brasiliense, 1987).

51. N. B. Peixoto, ‘Presentation’: this can be read at www.pucsp.br/artecidade/site97_99/ac3/apresi.html

52. N. B. Peixoto, BrasMitte (São Paulo, SESC, 1997). It was an international project supported by the German cultural centre (Goethe Institute). The idea was to link two former industrial areas: Brás, in São Paulo, and Mitte, in Berlin. East Zone was also a huge art intervention in a former industrial building in the Eastern part of São Paulo. An overview of these projects can be seen at www.artecidade.org.br

53. The project can be seen at http://www.pucsp.br/artecidade/mg_es/index.htm

54. N. B. Peixoto, A new territorial device, can be read at www.pucsp.br/artecidade/mg_es/textos/mges_i.pdf.

55. N. B. Peixoto, Territory, can be read at www.pucsp.br/artecidade/mg_es/english/territorio.htm

56. N. B. Peixoto, Operationaldiagrams can be read at www.pucsp.br/artecidade/mg_es/english/diagramas.htm
