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Urban public space: convergence point of physical and digital environments

Mapping the accessibility in the 'knowledge economy' era

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The recent urban dynamicity has been mainly intensified by the emergence of intangible components of the communication era. Since the architecture is somehow the physical embodiment of man's interaction with his environment, such phenomena, above all other features, have had consequences also in architectural and urban projects.
The problem of 'publicness' in the contemporary urban space has gained further complexities due to the changing meaning of 'accessibility' into 'check in' as in some geo-social networks. Therefore the concept of 'access' is turning from 'public right' into 'merchandise', creating conflicts between the need for free accessibility to the public spaces - in both physical and digital terms - and the private interests behind the new born 'knowledge economies'.
The paper will examine the mentioned problem - in a selected case study - by overlapping maps of the 'wireless' environment with physical infrastructural network, analyzing the coherence, lacks and potentials to conceive their future convergence within the public spaces system.

Keywords: Physical/Digital Infrastructure, Accessibility, Public Space

1. Introduction

Before the late 18th century, the urban contexts, besides their morphological characters and forms, were representing the main information and orientation of the city for the travelers and strangers about the city structure. For instance, *meydan* in the Islamic architecture, or *piazza* in the occidental one, along with the dimensions of the streets – which end into these open spaces or come from them – have always been the best elements to keep oriented while moving in the cities and so were the monuments and 'land marks' according to Lynch (Lynch, K., 1960). Therefore the perception and observation of a pedestrian along the way was related to the speed of his movement and had an essential role in experiencing the spaces while

passing through the urban context. In this case, the 'city fabric' was the most important provider of the spatial information and the monuments, according to Aldo Rossi (Rossi A., 1976), were the emblematic image of the whole city's deconstruction – as city's memories of the past. Throughout the time and by the technological developments and industrializations, followed by increasing the movement speed, the role of these elements had been reduced and left just inside the short pedestrian paths.
Nowadays, with the invention of the internet and the development of informatics, the role of these information providers are shifting to the communication instruments such as smart phones, tablets, etc..
Their presence in the daily activities and their influence on the physical experiences of the space are evident. In fact, it seems that both spaces – reality and virtual – with the same functional aspects and different kind of experiential dimensions are changing the present lifestyles simultaneously. Accordingly, we might realize two ranges of velocity in the urban mutation process: the cities physical contexts mute with a slower speed – measured in seconds/minutes –, while alterations of the non-physical layer (related to the communicative devices and the narration of information) are measured by megabytes/gigabytes. Therefore, the lack of compatibility between these two speed ranges makes the contemporary urban spaces more intricate to comprehend when 'human sense of time'– as Kevin Lynch states – is gaining a new and different 'biological rhythm' until the question: «what time is this place?» (Lynch, K., 1976).
Accordingly, the spatial experience of the persons is somehow losing its physical and tactile qualities while the 'immaterial dimension' of urban public spaces – related to the communicative devices and the narration of information – is becoming more dominant. In such a situation, while the architectural forms, and so the spatial dimensions of these spaces, remains the same – or mutes slowly –, their *spector* is quickly changing, as if the media were being assembled to the built body of urban spaces as a 'prosthesis' that overshadows the physical forms, or as a new layer, above the constructed environment. Beside the psychological problems of the issue, the problem of contemporary public space, in the architectural and urban design field, therefore, could be: how to think and create forms that will be able to embody the layer of information and communication inside themselves? The mentioned problem relates, as explained before, to the separation of the physical layer and the immaterial layer of these spaces. It means that the main components of the physical dimensions are detached from the immaterial dimension, namely:

- narration of fluid information;
- time unit;
- simultaneity of presence, or the accessibility to information from different places at the same time and, in so, being present virtually in more than one place simultaneously.

Based on what has been explained previously, the questions that rise here are: how can we describe contemporary 'good city form'? (ibid.) and with what indicators can we measure 'vitality, sense, fit, access and control' (ibid.) within the urban public spaces?
The revolutionary process of the media and communication technologies is developing inevitably and future generations will witness its consequences in the architectural and urban forms. This research could be an opportunity to analyze and re-reading the different passages of the media and communication development within the urban contexts as an attempt to anticipate the future typologies of the urban public spaces. «Now we have made e new nature – this technological urbanized region which is the new chaos – but as architects and urbanists we still have the same task» (Frampton, K., LeCuyer, A.W., 1999).

2. The importance of access as new paradigm of publicness evaluation in urban spaces

Since, in the knowledge economy era, we are witnessing the rise of the cognitive capitalism and a consequential, deep erosion of the threshold between work and leisure life time, the urban spaces involved in the different activity spheres undergo a similar identity blurring. Private (our relationships) and public life (our work) are therefore melted in urban places whose degree of 'publicness' becomes increasingly uneven and uncertain, needing a radical revision of the criteria to be adopted for its evaluation.

Ali Madanipour suggests an adjustment of criteria earlier drawn by other authors as a composition of 'interest', 'actors' and 'access' (Benn I., Gaus G. F., 1983), particularly concentrating on the latter, to which he gives further articulations, dividing it in:

- Physical access: as material access to the environment;
- Social (or symbolic) access: in relation to the positive or negative reception that specific social groups experience in the space;
- Access to activities and discussions: particularly regarding development and use processes of the space itself;
- Access to information: again regarding development and use processes of the space itself (Madanipour A., 2010).

Concerning the last point, however, it could be argued that a deep comprehension of the meaning and the importance of information as a measuring indicator for access has been heavily underestimated by the author, particularly if we assume a point of view oriented to the contemporary aims of planning the 'city smartness' as a system of networked public spaces (Pinto A. J., Remesar A., Brandão P., Nunes da Silva F., 2010). Moreover, access should be intended not only as *accessibility from outside* to the public space, but much more as the capability of the space itself to provide *access from inside* to the global dimension, namely the web. This new feature could be named – using a neologism – 'accessitivity', and therefore we are dealing about the rise of the necessity of 'accessive' public spaces.

But, other than this, another element needs very cautious observation: the increasingly broad distribution of locative media, or media that use mobile devices to exchange data based onto geographical information. Their undoubted rise, along with the spread use of the so called 'location-based social networks' (LBSN, or otherwise 'geosocial' networks) and their asymptotic convergence with the GIS (Sui D., Goodchild M., 2011) puts some new questions about the topic of access as a hybrid physical/non-physical urban issue.

This becomes progressively clearer as the main feature the most well-known LBSN are built around is the 'check-in'. We could take *Foursquare* as the easiest and most appropriate example[1], but similar functions are also present in *Facebook* (which has recently acquired *Gowalla*[2]), *Google Latitude*, *Twitter* and basically in every social network with geographic utilities. In all of them, every user can create the identity of a 'place', geotagging its presence on a shared map. From that moment on, all the users become able to check in that 'place'. In *Foursquare*, particularly, a series of gamification tactics provide the user with high motivation to check in those 'places' whose identity is linked to commercial business in the real world[3]. These tactics are basically borrowed to the field of strategic marketing (as discounts, promotions, gifts or advantageous sale options) and generating profits for both the place owner (in terms of increased business) and the social network (in terms of traffic, subscriptions and personal information submitted), providing a social service that is apparently free for the user, who is actually paying it with a new form of exposure to commercial aggression. In fact, some of the mentioned location-based applications include the use of 'geofences', that are virtual perimeters geotagged around a 'place'. Crossing these boundaries causes some forms of data exchange between the citizen/user and the application, often implying the receipt of a sponsored notification.

As in airports or everywhere the act of trespassing a threshold is loaded with critical meaning, making a check-in for a real place (fully belonging to the urban physical dimension) on a social network (only existing as an online ambit) is equivalent to making an access declaration and, therefore, acknowledging the existence of a barrier in the physical environment, even if an immaterial (or cognitive) one. If, in terms of defense of a urban publicness principle, this phenomenon could in any case be considered at least controversial, it actually seems even more alarming since it turns out as fully based upon a commercial nature, or pure private economic interest.

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[1] The choice has been made based on the vast use and popularity of the application as it is used continuously by over 30 million users, as described in http://www.foursquare.com

[2] The news is online since dicember the 2nd, 2011, on CNN Money:
http://money.cnn.com/2011/12/02/technology/gowalla_facebook/index.htm [last access april 4, 2013]

[3] As clearly explained in the dedicated page: http://business.foursquare.com/.

But, other than this, new problems emerge when we are called to witness an increasing diffusion of the use of LBSNs as tools for the self-representation (and therefore, self-description and self spatial and strategic orientation) of the city. The following part describes an investigational inquiry – still in progress – as a phase of 'experimental contextualization' regarding the themes of access and publicness of the urban space through the analysis of what could be called a problem of 'public ethics of urban representation' in the location-aware information era.

3. An experimental contextualization

As explained above, the recent urban dynamicity could trustingly be said to be intensified by the emergence of digital communication ambits. Therefore, the main focus of this part is on the cognition of these ambits in relation with the spatial analysis of 'physical accessibility' of the defined case study in order to prepare the basis for a re-examination and verification progress of the traditional/classic spatial indicators – exactly those vitality, sense, fit, access and control Lynch dealt about.

The main goal of this phase is therefore to examine possible answers to the following questions: how do these 'digital communication ambits' relate to the physical space we inhabit? And how can we, as designers and planners, define this in relation to space-use, space-publicness and their connectivity, permeability and porosity in both physical and virtual dimensions?

The proposed framework is divided into three main actions in two ambits. The actions are divided into 'Exploration', 'Extraction' (II) and 'Exam', which occur in physical and virtual ambits. The context is Milan eastern edge, Segrate and Linate[4].

4. Ambits

The physical ambit relates to the places where the existing Wi-Fi environment is accessible – in both public and private sectors – and aims to lead towards a mapping process. Those places could be interpreted as 'departure areas' or 'entrance areas' to access the ambit of locative media.

The virtual ambit relates to virtual interaction with physical places within the social networks among which *Foursquare* is taken as example. Indeed, the relevance of such application with our discourse is the previously describe 'check-in' action, by which a virtual territory is being created by people who experience the physical space of the city: a *meta terrain* with relational network and communication infrastructure.

5. Actions

I. Exploration

The action has been realized within the physical context of the city where the existing private Wi-Fi environment has been explored through the two steps of 'data capturing' (I.a.), and 'intensity contextualization' (I.b.) processes[5]. The presence of Wi-Fi fields detected has been mapped according to their locations and varying intensity. *Google MyTrack* has been selected as tracking program and installed on a smartphone; the measurement unit is the Wi-Fi antenna of an *iPod* and the covered area includes the North-West entrance to Segrate from Cascina Gobba station, towards the central and eastern parts of the city, down through the Idroscalo and finally South-Western via Forlanini (as it can be seen in the images below).

[4] The defined concept relates to the ongoing laboratory research. Due to the vastness of the area, this part of the experiment has been restricted to the central part of Segrate where there is the highest accumulation of inhabitants.

[5] So far, nearly similar experiments of mapping Wi-Fi areas have actually been produced. Above all, it could be useful to cite the Salt Lake City Wi-Fi Map developed at Senseable City Lab, MIT. See Sevtsuk, A., Huang, S., Calabrese, F., & Ratti, C. (2008, in press). *Mapping the MIT Campus in Real-time Using WiFi.* In M. Foth (Ed.), *Handbook of Research on Urban Informatics: The Practice and Promise of the Real-Time City*. IGI Global, Pennsylvania, 2008.

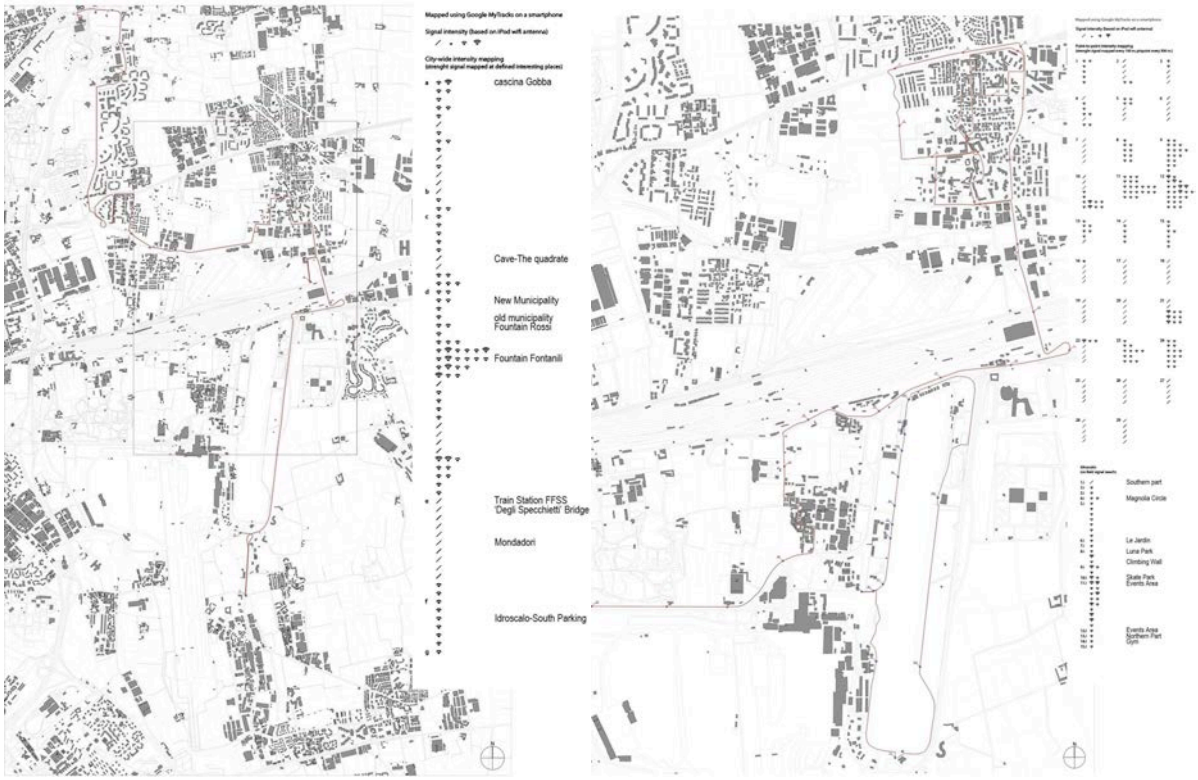


Figure 1. *Data Capturing Process: traced path with captured points*
Figure 2. *Data Capturing Process: traced path with captured points.*

I.a. Data capturing process. This first step has been developed according to three modalities:

1. City-wide intensity reading. Strength signals have been captured at pre-defined places of interests, which are: Cascina Gobba, 'cave', the new and the old municipality offices, Aldo Rossi's monument, Fontana Fontanile, FFSS train station, ponte Specchietti, Editrice Mondadori and Idroscalo (Figure 1).
2. Point-to-point intensity reading. Strength signals have been captured every of 100 meters and pinpointed with an interval of 500 meters. The area of interest covers mainly the central part of the city and continues towards the West and via Forlanini (Figure 2).
3. Idroscalo, on-field signal search. The area is dedicated to the Idroscalo and the intensity reading has been based on random data captured by the Wi-Fi antenna (Figure 2).

I.b. Intensity contextualization. In the second step, the captured data have processed basing on their intensity and illustrated in three-dimensional graphic. *Grasshopper* has been used as processing program and *3D Studio Max* to generate the following illustrations.

By reviewing different technical information, it can reasonably be estimated that each Wi-Fi provider covers a spherical area with 50 meter long radius (Wi-Fi Alliance, eds., 2004;2003). Since we captured data 'on' the physical surface, the lower half of the spherical area has not been considered for the processing operation. Therefore, there were semi-spheres to be assumed as quantitative factor for the active Wi-Fi areas. The qualitative factor is the signals intensity which degrades from sphere center towards the outer surface, as shown below (Figure 3).

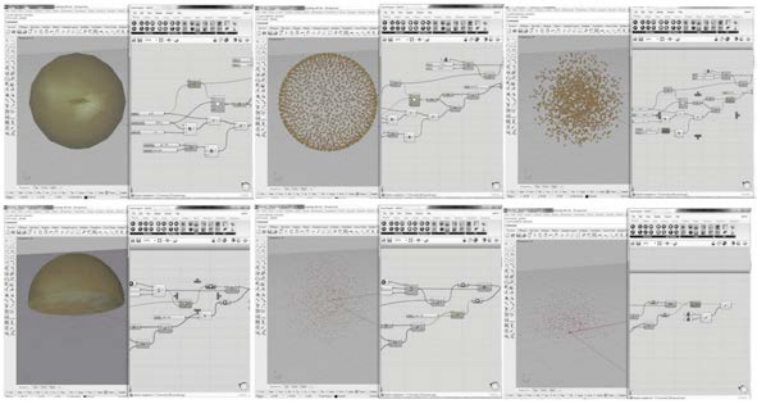


Figure 3. *The progressive screenshots of processing the captured data from abstract radius-based sphere to cloud with gradually decreasing field intensity.*

After processing captured data based on intensity and covered areas, the resulted 'dotted semi-spheres' (Figure 3, lower right) had been integrated to each corresponding point. The following images (Figure 4 and 5), show the existing Wi-Fi environment of Segrate.

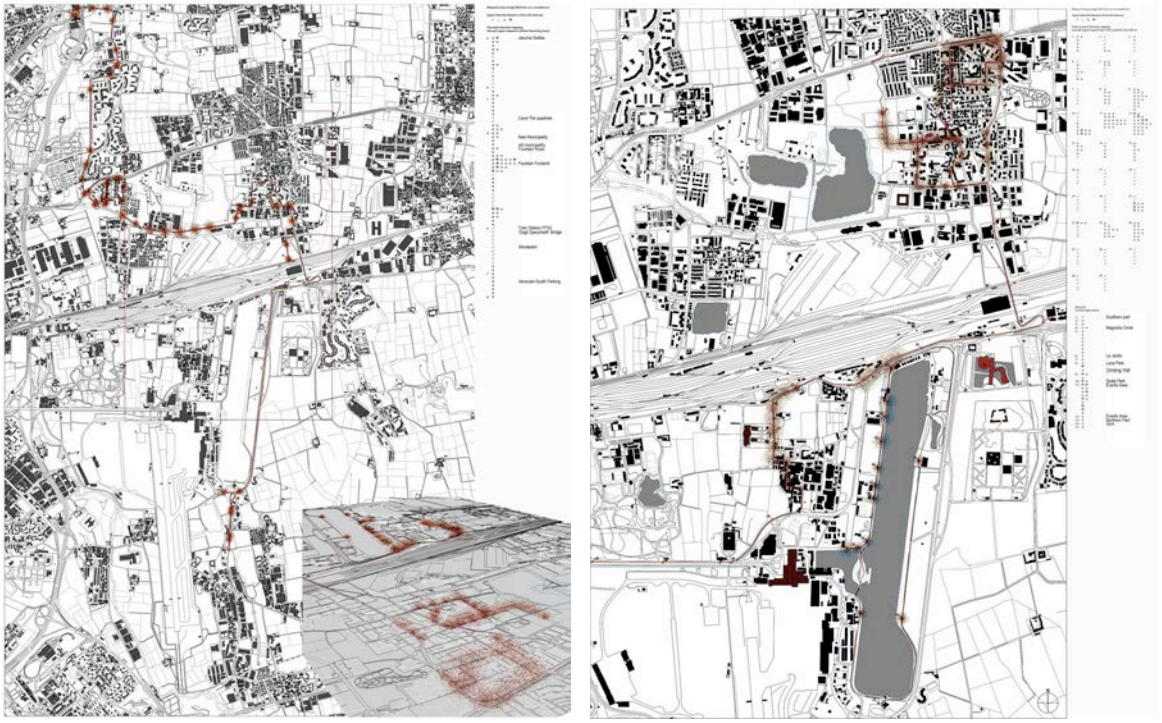


Figure 4. *wi-fi covered areas of 'city wide intensity reading'*
Figure 5. *wi-fi covered areas of 'city wide intensity reading'.*

II. Extraction

This action occurs within the virtual ambit and is developed by localizing the checked-in 'places' by *Foursquare* users (Figure 6).

Figure 6: *Foursquare checked-in 'places' location for Segrate, with the indication of the municipal boundaries*
Figure 7. *quali-quantitative map of urban dynamicity. The areas colored in blue represent the blurry dimension of this representation, since check-ins are possible in a certain range of distance from the registered 'places'. The darker the shade, the highest the number of interactions. The first number under every location name is the relative number of check-ins ever made in the place; between the fences there is the number of users that have ever logged in it.*

The aim is to extract physical places of interest in the virtual platform. The resulting quantitative information regarding the virtual accumulation of people in different place and (or, their meta-frequency) has then been represented in a quali-quantitative map where the names corresponding to the locations have been magnified in relation to the numbers of check-ins. As shown below, the resulting picture portrays a town whose most dynamic places of interaction between the physical and the virtual ambit are two private companies (*IBM* and *Microsoft*). The central station comes only after them, nearly followed by a steak house (*Roadhouse Bistecceria*) and a supermarket (*Esselunga*), while all the other traditionally conceived public places have a much lower weight, according to the representation criteria (Figure 7).

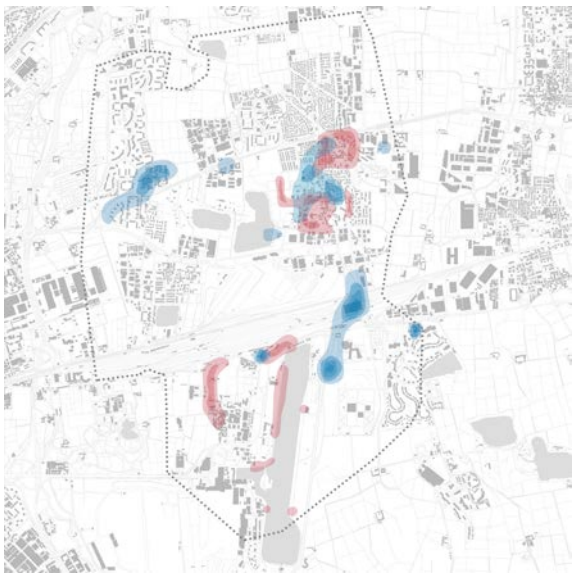
III. Exam

The final step is the superimposition of the first two and is meant to examine the public frequency in virtual ambit regarding the case study. As a first action, a comparison between the areas where check-ins occur and the previously mapped private Wi-Fi field density clearly reveals their complementarity (Figure 8). This can be easily explained in the central residential area, where the check-ins are mainly made in open or 'public' spaces, while the private Wi-Fi predominantly belongs to the residential blocks. Anyway, these data do not provide any information about the kind of connection *Foursquare* users hang onto to make their check-ins: is it by personal permanent Wi-Fi access provided by telephone companies through the satellite connections? Or is it by Wi-Fi public/free hotspots?

To answer this question, a map of the public Wi-Fi areas has been made with the information directly available on Segrate municipality website[6], localizing open hotspots in two civic centers (Milano 2 and San Felice), two *cascine* (Commenda and Ovi) and two park areas (Area Eventi CentroParco and Parco degli Alpini) (Figure 9).

[6] http://www.comune.segrate.mi.it/benvenuti/aree_wireless/index.html [accessed April 28, 2013]

The superimposition of the different layers makes allows to infer that, since the public hotspots are almost never even included in the 'blue areas' of *Foursquare* place influence, the mobile device handlers have been using their own (paid) Wi-Fi connection to make the check-ins.



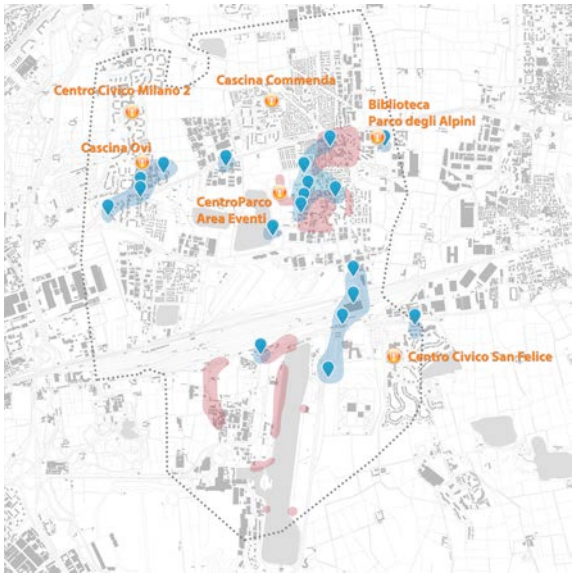


Figure 8. *comparison between the Foursquare checked-in areas (blue) and the private Wi-Fi field density (red).*
Figure 9. *public Wi-Fi areas (orange symbols) localization compared with the private ones and the position Foursquare 'places' (blue pins). There quite evidently is very minor matching.*

6. Conclusions

Many conclusions would be possible at this point.
First, the Figure 9 itself tells us about a town whose locative self-representation identifies as mostly important some definitely private places, while no *Foursquare* user has ever felt the need, the desire or simply any benefit in sharing their position in the places where the public Wi-Fi areas are. This could be ascribed both to the unattractiveness of those places – at least for the youngers –, or to some sort of 'online hyperattractiveness' of the private offices gaining those many logins.
Of course, the limits of this research are the limits of *Foursquare*, whose capability to represent the sense of belonging of the user to a territorial community is actually to be considered partial for different reasons: the age and cultural level of the users is still too centered in a small social group, and *Foursquare* itself has probably the strongest commercial attitude among the most used LBSNs. The research is, as a matter of fact, still in progress and the critical selection of tools itself is part of the experimentation.
Nevertheless, even with these strong softenings, the inquiry can be said to portray very clearly an unsatisfied need of free Wi-Fi connection at least into the central station area, which should be taken into consideration by the administration, thanks to this research. Therefore, a repeatable process can be imagined after this experimentation, in which the strategic positioning of public Wi-Fi areas could be decided after the construction of maps of the virtual use of the territories via location-aware media and social networks.

But, in a wider sense, the result of this research could help evaluating the accessibility degree of places and through the comparison between the existing Wi-Fi areas – the 'departure areas' – with the checked-in places, the level of their publicness could be examined. In other words, if a public space has been checked-in without public access to the global web, it could not be considered as *fully* public in today's

social lifestyle, since this new generation of 'access rights' should not be totally controlled and managed by private communication companies with business interests.
And, mostly, this inquiry helps in putting some new questions on the table.
How many virtual check-ins could have been done using the public access to the web? How many of city's public spaces are multi-dimensionally accessible? Is it only the matter of lacking hot spots or there would be a theoretical problem related to these 'meta-spaces' which are effectively changing our ways of interaction with the urban spaces? Is the 'good city form' extending towards the virtual space? Can we integrate the virtual use and experience of physical space to the traditional indicators?

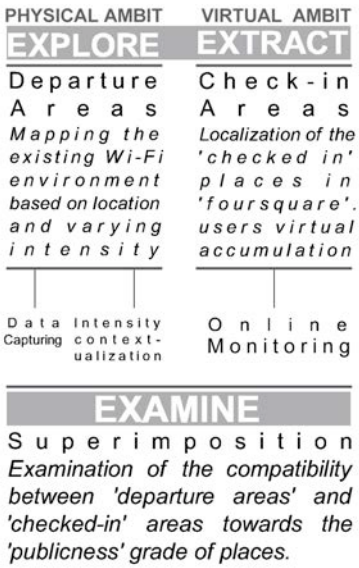


Figure 10. *strategic scheme of the actions.*

References

Benn I., Gaus G. F., (1983), *Public and private in social life*, Taylor & Francis, Oxford.
Frampton, K., LeCuyer, A.W., (1999), *Mega form As Urban Landscape*, University of Michigan College.
Lynch, K., (1960), *The Image of The City*, M.I.T Press, Cambridge.
Lynch, K., (1976), *What Time is This Place? The MIT Press*, Cambridge.
Madanipour A., (eds., 2010), *Whose public space?, Routledge*, Abington-New York.
Pinto A. J., Remesar A., Brandão P., Nunes da Silva F., (2010), *Planning public spaces networks towards urban cohesion*. ISOCARP 'Sustainable City / Developing World' Congress, Nairobi.
Rossi, A., "La città analoga", in *Lotus*, n.13, 1976.
Sui D., Goodchild M., (2011), "The convergence of GIS and social media: challenges for GIScience", in *International Journal of Geographical Information Science*, 25:11, pp. 1737-1748.
Wi-Fi Alliance, (eds., 2004), WPA™ Deployment Guidelines for Public Access Wi-Fi Networks
Wi-Fi Alliance, (eds., 2003), Securing Wi-Fi Wireless Networks with Today's Technologies

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