Digital methods and social practices in public space – some salient themes

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A number of the above papers portray a useful 'state of affairs' with the use of digital technologies in enhancing spatial experience, in understanding users' behaviour or even in empowering citizens to (virtually) learn more about urban spaces (such as historical spaces that do not exist anymore). Some papers further raise a number of new, important, questions, including ones of an ethical nature, particularly with regard to the extent to which new technology may be used in monitoring the activities of other individuals. The papers reveal a clear *leitmotif* running throughout the entire track, namely, the duality of the challenge we are facing, as we deal with two main types of questions:

    (a) the 'how' questions, addressed to technology – such as, how to collect and visualise data, how to encourage people to share information and ideas and how to develop the most appropriate and effective tools to address specific research questions and provide people with additional knowledge; and

    (b) the 'why' questions, related to social practices of public space users – such as why users behave in a specific manner, why do we want individuals to participate and why do we want to have this data that is being collected by the above-mentioned tools.

In the conference discussion that ensued, speakers emphasised the need to first understand, or even define, the link between technology and social practices of users. If we understand why we need particular information, it would be easier to design or further develop the technology for it. Speakers also raised the issue that different tools / methodologies bring different data. So the more fundamental research question must centre on what appropriate methodologies one should use, particularly so as to create tools that enable one to obtain unbiased and objective results. The discussion developed into the need to merge quantitative and qualitative research methods, and the utility of more traditional methods that may complement the new technologies in learning about people and space.

The final session addressed the issue of how this newly gained knowledge regarding social practices may inform planning decisions, not as means of feeding this data, obtained from people, for top-down decision-making, but rather using the data to allow people to be empowered in the design and planning processes in a bottom-up manner. In order to enable this to happen, the role of the spatial planner and designer must be rethought as being more of a facilitator who may translate this data in a manner that may be easily interpreted by the citizens so as to truly make a positive contribution to their quality of life.

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PART II
ETHNOGRAPHIC CHALLENGES AND THE CREATION OF DIGITALLY MEDIATED URBAN SPACES

Behaviour, expectations and preferences of 'digital natives' in regard to the design of urban public spaces

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Abstract – *The possibility of ICT applications in designing outdoor public spaces is essential. In order to enhance a healthy lifestyle and bring people outdoors, it is crucial to study the behaviour of ICT users and understand their expectations related to attractive public spaces. Currently in Poland, Wi-Fi technology is widespread, mainly in buildings, and outdoor hot-spots are still rather an exception.*

The research results let us identify 4 main groups of Wi-Fi users characterised by different activities performed in urban spaces: focused on work; focused on entertainment; transit pedestrians; or, tourists. For each user group studied, its preferences, needs and expectations in regard to successful and attractive public open spaces were identified. The research results enable further elaboration of design guidelines and principles for modern outdoor ICT - friendly public space, e.g. a cyber park.

Keywords: urban ethnography, green spaces, ICT, society, city.

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I. INTRODUCTION

Modern life, for the majority of urban citizens, revolves around the features of civilization, but it is also linked with negative effects, such as less contact with nature. Current realities and societal expectations impose on people a new way of working, with new leisure activities and lifestyles. One of the determinants of a changing society is omnipresent: over the past two decades a new generation of 'digital natives' has emerged - people who feel safe only in environments dominated by electronics ([1], [2]), or in other words a generation of tech-savvy young people immersed in digital technologies [3]. We might assume that those young people might avoid spending time outdoors. At the same time, more attention is placed on environment protection issues and, on the other hand, physical, direct contact with nature is less frequently achieved by citizens. It might be summarised that, we experience 'times of fear of nature' [4]. Nevertheless, in general, people are social beings and they tend to meet each other. Presently, in urban agglomerations, it is difficult to start a spontaneous conversation with a stranger as citizens are constantly busy and public spaces resemble more 'spaces of flow' than places for social gatherings. People seek contact with others and they need a foothold that could help them to initiate such contact. The architecture and built environment in many cities is insufficient in terms of creating

a space for social interactions. These contacts require something more than just a building or a square, but a well-designed public space that enhances conversations and direct contact, for example, is needed. The proper design of public pro-social space can promote and invite interactions [5].

According to Gehl [5] there are three types of activities that take place outdoors: 1) necessary activities, 2) optional activities and 3) social ones. The necessary activities do not depend on the quality of space or physical conditions, as they must be realised anyway, e.g. shopping, commuting to the office or school, etc. These activities are cyclical and arbitrarily enforced, whereas the optional activities are freely chosen by users. Thus, they are determined by the quality of space and depend on weather conditions, time of day, etc. These actions include recreation, rest and reading. Last, but not least, the type of activity, which might be described as an outcome of the two previously mentioned, is known as social activity. This group includes conversations, social contacts and spending time together. These activities depend mostly on the physical conditions and weather. For the proper functioning of public space it is necessary to design it in a way that allows users to perform optional and social activities most frequently. These activities should happen naturally and freely.

The design decisions can affect people's behaviour, creating positive or negative conditions to stay outdoors. The right planning and design decisions create a vibrant city. There is a close relationship between the quality of urban space and the activity of the citizens. The more time people spend outdoors, the more interactions occur, and people consider the environment to be more friendly [6]. People prefer to stay in groups, they mutually attract and stimulate each other. The possibility of getting together, listening, observing, etc., provides an opportunity for contact with others, such as starting a chat, studying social life, enrichment of public life, gaining experience and inspirations [7].

However, the mobile Internet users create a specific social group, and while being in public spaces they choose the sites rarely visited to ensure their privacy. The observations performed by Hampton, Livio and Sessions [8] suggest that people avoid the crowd in general, and 40% of them choose a place, which is emptier than the surroundings, while 50% prefer places with similar density, and only 10% chose sites, where there are more people than average. Very rarely they use the places where there is nobody present. In public spaces, for the 'digital natives' users, the virtual contacts are more important than the real ones [8]. Moreover, possessing a mobile device, and using it, creates a kind of 'bubble', which is a means of protection against the unwanted social interactions or relationships. At the same time, for other pedestrians or users of public space, the mobile Internet users are perceived as unapproachable and reluctant to establish contacts. The existing stereotype is that the typical mobile Internet user is a young, single, educated man. Studies show that about 70% of people using the hot spots are those who are not in relationships, or do not live with a partner. Therefore, 80% of users usually come alone and make an impression of a lack of interest in the activities of others. When it comes to motivation for why people choose to use the hotspots, it appears that they need a change in a working habitat, or

are pressed for time and need to find the necessary information while being outside in public spaces [9].

This paper presents the selected results of a broader study on guidelines for the organisation and design of hotspots surrounding green spaces, performed in 2015. The aim of the study was twofold. First, to identify the behaviours of wireless Internet users in public spaces and, secondly, to examine their expectations and preferences in regard to the organisation of public spaces that enable the use of new technologies in open areas.

II. MATERIALS AND METHODS

The performed research included 3 stages: 1) passive observations of Wi-Fi users in urban public spaces (both indoor and outdoor), 2) individual interviews with selected users, and 3) an anonymous on-line surveys aimed at understanding their preferences. Additionally, the research was complemented by a survey among suppliers of mobile Internet.

The passive observations were conducted in three Polish cities - Gdańsk, Katowice and Warsaw. In order to study behaviour of Wi-FI users in various settings, four different hotspot surroundings were selected. The Wi-Fi users were observed in:
1) outdoor hotspots located in open public spaces, without the possibility of comfortable use, i.e. bus station, city main square and streets,
2) outdoor hotspots located in open public spaces, with the possibility of comfortable use, i.e. urban parks,
3) indoor hotspots with free Wi-Fi Internet access in a commercial building, i.e. cafe in a downtown area
4) indoor hotspots with free Wi-Fi Internet access located in a commercial building, i.e. a shopping mall.

Places of observations were selected in a way that allowed for the most effective examination of the phenomenon of the use of hotspots. Moreover, the hotspot locations in different cities were comparable to each other in terms of distance from the city centre, popularity of location, function, or free public access. Table 1 summarises the characteristics of locations, where the passive observations have been carried out. Each location has been visited twice and the overall time spent for the passive observations has been 24 hours.

The second phase of the research included individual interviews with selected users. This stage was designed as a transition between the passive observations and actual anonymous on-line survey. The individual in-depth interviews allowed users to freely express their opinion on hotspots, and on the other hand, they helped us to understand the users' motivations and to explain some of their behaviours. The research sample was 20 interviewees. The responses of the users were varied and it was difficult to group them into homogeneous outcomes, that is why they will not be presented in this paper further. However, those replies allowed us to have a broader look at the problem and were used as a base for the on-line questionnaire construction, which was the main research tool applied.

TABLE I. CHARACTERISTICS OF VARIOUS HOTSPOTS SETTINGS

No.	1	2	3	4
Type of hotspot	An outdoor hotspot located in open public spaces, without the possibility of comfortable use	An outdoor hotspot located in open public spaces, with the possibility of comfortable use	An indoor hotspot with free Wi-Fi Internet access in a cafe	An indoor hotspot with free Wi-Fi Internet access in a shopping mall
Hotspot's characteristics	• an open public space, equipped with a signal transmitter, but without any recreational equipment • very few benches or no benches at all • noisy surroundings • heavy car and pedestrian traffic	• an open public space, equipped with a signal transmitter • urban furniture enabling rest, e.g. benches and seats • in a quiet environment with moderate car and pedestrian traffic	• an indoor space equipped with a signal transmitter • with the possibility for rest, work or refreshment (food and drinks available) • comfortable furniture and interior design • free access to charging (electric sockets) • quiet atmosphere	• an indoor space equipped with a signal transmitter • free access to charging (electric sockets) • crowded and noisy place

The on-line survey was the next step following the passive observations and individual interviews. The survey was aimed at authentication of previously collected data and also as a further study of expectations of a wider Wi-Fi users group. The questions dealt with present ways of Internet usage, both indoors and outdoors. Besides, the users were also asked about their preferences in terms of hotspot location in open public spaces. Altogether, one hundred on-line surveys were collected.

III. RESULTS

The passive observations

The passive observations were performed in four different types of hotspot settings. Figure 1 shows the number of users observed in each type of hotspot surroundings and an average length of their stay.

The outdoor hotspots located in open public spaces, without the possibility of comfortable use, have been most frequently visited by users. However, the time users spent within the hotspot area was the shortest. On average, such Wi-Fi access point were used by 15 people per hour and 80% of the Internet users were single people, using their own device quietly, without any interactions with the surroundings. The observed users spent approximately 5 to 10 minutes within the hotspot zone and they actively used their devices for 5 minutes. The great majority of users were using smartphones (94%).

The largest group observed were teenagers (42%), but also the age group of 18 - 30 years old was well represented (33%). Other observed users were older. People using the free Internet within a hotspot area for a short time usually did not care about the privacy of their screen. Approximately 80% of the users did not cover it at all, and the remaining 20% covered screens only partially. Using the Internet was usually an additional activity, mainly because people seemed to be waiting for someone or something (79%). In other cases, they stopped for a moment to rest, look around or for a quick refreshment or a snack.
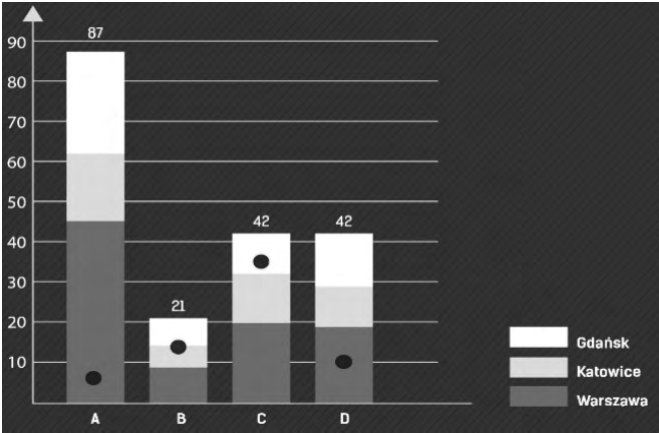
● Mean length of stay within a hotspot area (in minutes)

A - outdoor hotspots located in open public spaces, without the possibility of comfortable use;
B - outdoor hotspots located in open public spaces, with the possibility of comfortable use;
C - indoor hotspots with free Wi-Fi Internet access in cafes;
D - indoor hotspots with free Wi-Fi Internet access in shopping malls.

Fig. 1. Number of users observed in each type of hotspot and the mean length of their stay.

As it concerns the outdoor hotspots located in open public spaces, but with a possibility of comfortable use, i.e. urban parks, the number of users observed there was much smaller than in hotspots without any easement. Such hotspot zones were used approximately by only 4 people per hour, however people stayed longer. On average, they actively used their mobile devices for 15 minutes, and 85% of users enjoyed smartphones. Nevertheless, it is important to point out that using a mobile device was an additional activity for the majority of users (66%). At the same time, one third of observed users didn't stop using their smartphones for the whole time spent within the observation zone. It shows how strong the need is to use mobile devices and "be-online" constantly, even while being in a park. Among all observed, single users predominated and bigger groups of 3-4 people chatting and using the Internet together were sole incidents. All observed users preferred a quiet and calm way of spending time within a hotspot zone. As it concerns the age of observed users, the most frequently represented were young people between 18 and 30

years old (52%), however teenagers were also quite popular (28% of all observed users). Users observed in the park hotspots placed more attention on privacy issues and for the majority (66%), they chose sitting places carefully enough not to show their screens. On the contrary, 14% of those observed did not care at all about privacy, and it was very easy to spot their actual activity.

Another type of hotspot are cafes with Internet access. In such places, the presence of users does not substantially depend on weather conditions. On average, in observed cafes, 7 persons per hour were using mobile devices. Among them, 47% of users were using portable computers, and moreover 90% of them were also charging the device. The smartphone users made 42% of a total number of observed people, but only 11% of them were actually charging the mobiles. The rest of the observed users enjoyed tablets without the need to recharge them. In the cafes, the length of the session was the longest in all four types of hotspot settings, and the users typically devoted more than 30 minutes to use of the Internet. In regard to the age of observed Wi-Fi users, the most frequently repre-sented age group were young people between 18 and 30 years old (50%) and, similar to previous types of hotspots, also teenagers (40%). In cafes people more often stayed in groups of 2 - 3 people (40% of groups) or bigger than 3 people (20% of groups). As a result, a majority of observed users (60%) behaved louder as typically they combined chatting, drinking coffee or eating with checking something on a mobile phone or working together on a computer. As it concerns the privacy of screens, the users covered them partially (62%) and only a small number did not pay any attention to that (12%).

The last evaluated type of hotspot was an indoor hotspot located in a shopping mall or other service building. Hotspots in commercial buildings are a combination of external access points and cafes, as they combine characteristics of both types of hotspot. An average number of users observed within an hour is equal to the cafe hotspot (7 people per hour). The most commonly used device was a Smartphone (50%) and tablet (30%). Among all observed users, 40% of them used the possibility of charging the devices. In most cases (62%), the length of stay in the hotspot area exactly coincided with the time spent using the Internet, which was between 5-15 minutes. The additional activities, if any, were waiting for someone or something, or observation and rest (20%). As it concerns the time spent within the hotspot zone, the laptop users typically spent about 30 minutes there, and they mainly worked alone (85%) in a quiet way (90%). The rest were users in small groups of 2-3 people. The most common beneficiaries of the hotspots organised in commercial buildings were people from 18 to 30 years old (69%), and 20% were teenage users. The observed people usually partially left their screens uncovered (66%), and in case of 24% of users, one could completely check their activities, as the screens were well exhibited.

Each of the aforementioned types of hotspot allowed users to perform other needs. Therefore, users benefitted from these spaces in other ways. The collected data allowed for the initial determination of user groups, their needs and typical behaviour.

The on-line survey

The on-line survey was designed to study and explain the behaviour of users of mobile Internet, and to get to know their motivations and habits. Altogether 100 surveys were conducted, which helped to explain the previously observed phenomenon and to learn more about target groups.

Most of the respondents are people aged between 21 to 30 years old, who regularly use the Internet, and who define their standard of living as very good or good (87%). Among all of the respondents, 65% are employed people (with a defined workplace and working hours), 15% are the freelancers, and 20% are pupils or students. The mobile Internet users in open spaces frequently use Smartphones (81%). The laptops are selected by 15% of respondents, and the tablets only by 4% of them. The motivations to use the Internet outside of the home or office are various, and for 41% of respondents it is the need to quickly check on something. One third of respondents declare that they use the Internet while waiting for someone or something to happen, or when they simply feel bored. It should be emphasised that as many as 22% of the respondents' state that they go on-line regardless of the place of their stay and their real needs. Therefore, it is true that the most frequently declared activity was to search for current information (74%), but 70% of users use mobile Internet for browsing social media and entertainment. Furthermore, only 16% of surveyed people say they use the Internet for education or work.

Currently, the most commonly stated way to connect to the Internet in public spaces is a data transfer (63% of respondents). The 23% of respondents connect via Wi-Fi, and 10% choose a source of signal depending on its quality. Noteworthy is the fact that over 43% of users connects to Wi-Fi if there is an open network, and connection quality is sufficient. It is a very common habit that users choose a free Wi-Fi connection in situations when they cannot use data transfer (e.g. while staying abroad).

The respondents were also asked about the most frequently selected location of Internet use, and 30% of respondents declare that they use the mobile Internet around the clock, regardless of time and space. In fact, they're constantly on-line (see Figure 2). The second most popular place where people use the Internet is at home (22% of respondents), and the third is public transportation (17%). Only 10% of respondents' state that they use the Internet at work.

Another issue included in the survey was a question on the most popular place to work or study, but outside the typical spaces as school, university or simply the office. Surprisingly, the most frequently declared answer to perform the above mentioned activities is on public transport (41%). The libraries, cafes and parks were declared by 18% of respondents.

As it concerns the presence of mobile Internet, while choosing an alternative place for work or study, the majority of respondents' stated that it is desirable, but it is not the most important condition (54%). At the same time, for 19% of respondents it is the most important factor, while for 20% it is just neutral.
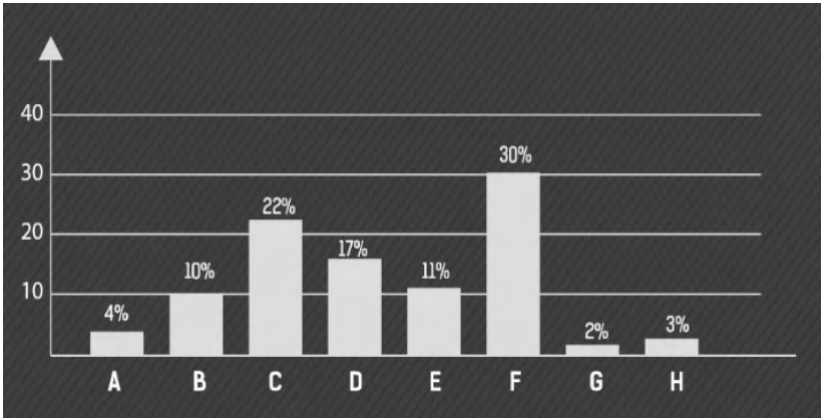
A - School / university; **B** - Office; **C** - Home; **D** - Public transport;
E - "I don't pay attention where and when I use Internet"; **F** - Everywhere / "I'm constantly on-line";
G - "I don't use Internet at all"; **H** - other answer.

Figure 2. The most popular places of mobile internet use.

The on-line survey questions were meant to investigate the attitude of respondents towards a specially organised hotspot. The respondents were asked if they would consider using hotspots in the future especially when located outdoors. The one-third of respondents declare a willingness to use such places and, as motivation, they mention a possibly longer time spent in the open air, a casual atmosphere of such place and an inspiring environment. Most respondents (52%) are undecided and only 16% say they are not interested at all in any type of hotspots. They explain such an attitude by stating they use the data transfer on their mobile and it is included in their overall bill for a mobile phone (see Figure 3).
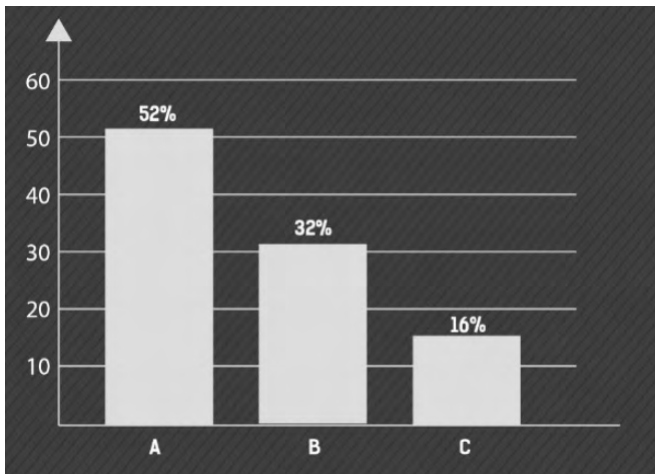
A - "I don't know"; **B** - "Yes"; **C** - "No"

Figure 3. The declared willingness to use furnished hotspots in public spaces (number of users).

As it concerns the time during a day when the hotspots would be most frequently used, 30% of respondents declared the afternoon and early evening hours. More than 60% of those interviewed consider irregular usage of such hotspots. Regarding the preferred distance from home or office to the nearest hotspot, the respondents are rather open, and they do not distinguish between varying distance. A crucial fact is whether the Internet access in the hotspot is provided for free, or if the users are obliged to pay. Only 20% of respondents agree to pay extra for the Internet connection, and the most accepted maximum cost is ca. 0.5 - 1.0 EUR per hour. At the same time, 51% of users confirm that they will not use any hotspot if it requires extra costs.

The respondents were also asked about the most important features or conditions that should be fulfilled while designing a proper hotspot. Among the most essential elements or factors, the users mentioned:
  · ensuring fast and stable Internet connection,
  · the ability to charge a mobile device,
  · a comfortable place to work,
  · the security,
  · the possibility of peaceful work,
  · shelters for unexpected changes in weather conditions,
  · aesthetic environment,
  · close to restaurants and cafes.

On the other hand, among factors that are not accepted in hotspot surroundings, the respondents listed: bad weather conditions, lack of charging possibilities, lack of comfort place for work, noise, sun reflections on screens, crowded spaces, presence of insects, ugly environment and strangers who might watch them.

IV. DISCUSSION AND CONCLUSIONS

The research results presented above, supported by the literature review, let us identify 4 main groups of Wi-Fi users. Those groups are characterised by different activities performed in urban spaces. Not all users use the hotspots in the same way. Our research enabled us to observe those who are focused on work, or fixed on entertainment, the transit pedestrians, and the tourists and indigent users, for whom hotspots with free Wi-Fi access is the only way to reach a virtual world (see Figure 4).

The main characteristics of those four various user groups are presented in Table 2. Moreover, specific users' preferences and expectations in regard to hotspot design are also defined. The research results enable further elaboration of design guidelines and principles for modern outdoor ICT - friendly public space, e.g. a cyberpark.

Figure 4. Four types of mobile Internet users: focused on entertainment (top left), tourist and indigent users (top right), focused on work (bottom left), transit pedestrians (bottom right). Photo credit: N. Kołodyńska

The city is a living fabric, but in order to not only support this life, but to improve living conditions for citizens, changes are needed. Those required changes very often relate to various branches of life, and the interdisciplinary nature of urban landscapes is a key issue. Adopting the theme of the wireless Internet access points functioning in the public realm is important from the point of view of urban design and landscape architecture issues. Constantly decreasing the amount of free time spent outdoors is partly the aftermath of the lack of an alternative public space attractive for the 'digital natives' users. Thus, the research on studying the behaviour and expectations of Wi-Fi users bring new knowledge and might help to improve the design of urban public spaces.

As many opportunities as possible to stay in the open air should be encouraged by a proper urban design, so that people feel a bond with the landscape and nature. It could initiate their other "non-technical" activities. The creation of free Wi-Fi hotspots within public spaces, or in other words, cyber parks, is not a persuasion to spend even more time on-line, but it is a response to the new needs and expectations of modern citizens.

**TABLE II. BEHAVIOUR OF MOBILE INTERNET USERS AND THEIR PREFERENCES
AND EXPECTATIONS IN REGARD TO HOTSPOT DESIGN**

USERS GROUP	USERS' BEHAVIOUR	EXPECTATION TOWARDS HOTSPOT DESIGN AND LOCATION
Focused on work	• work oriented • choose comfortable seats in peripheral location of a public space • lack of interactions with others, or if any interactions occur they are possibly subtle and non-verbal • avoid the sight of others • the mobile device is an excuse to prevent social interactions • usually come alone or in pairs • escape from the daily routine, change the pace of work and the environment • main activity: sending messages, web surfing, document preparation • the device as a tool not a gadget • the average working time is 3 hours • preferred mobile device: a laptop, tablet or a smartphone	• a reliable connection to the Internet • comfortable place for work • ensuring the long view for attractive landscape setting • a secluded site isolated from transit routes and crowded places, but enabling a feeling of co-existence in public space • the opportunity to observe the passersby • ensuring privacy of mobile device screen
Focused on entertainment	• first entertainment, then work • engaged in social interactions, often eye contact, • long stay in the same location • spending time in hotspot area as a way to meet new people • additional activities, e.g. reading of newspaper • Internet as a means for encouraging social contact • predominance of social media usage • constitute a local group, live nearby • do not pay special attention to protection of their screens • come alone, but usually meet friends in the hotspot area • engaged in environment • live or work closer, freelancers • prefer central location within a public space • average time spent 1 hour • preferred mobile device: a laptop or a smartphone	• location of hotspot in the area allowing for observations of passers-by • possibility of individual arrangement of space, e.g. mobile furniture • diversity of equipment
Transit pedestrians	• use the wireless Internet without a clear purpose, as a way for overcoming boredom e.g. while waiting for someone • sending e-mails, texting people • usually use the Internet in a standing position or in movement (walking) • short sessions (5 minutes) • the most frequently observed group in open spaces • preferred mobile device: a smartphone	• possibility of safe walking and using a mobile without any collision • iconic design, characteristic for the area • possibility of taking a short break, option for support of body
Tourists and indigent users	• they don't have free Internet access in other places • hotspot gives them a possibility to spend time in virtual world • longer sessions compared to transit pedestrians, but shorter than those focused on work or entertainment • average time in hotspot area spent is 30 minutes • preferred mobile device: a tablet or a smartphone	• location of hotspot in area well connected by public transport

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