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SUBWAY AND DIGITAL POROSITY OF THE CITY

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SUBWAY AND DIGITAL

POROSITY OF THE CITY

The paper introduces a metaphor "digital porosity" aiming to grasp the non-uniformity, limitations and gaps of digital connectivity (technological, material, spatial, social, etc.) in urban spaces. Being used as a research guidance, the metaphor raises the questions what digital porosity is? how is it produced? how is it changing? Based on the research of internet connectedness and practices of Internet use in the subways of Moscow and Saint-Petersburg, the paper states that the extension of the Internet zone and the inclusion of new urban spaces do not automatically increase the connectivity of the city, since the latter depends not only on the availability or the quality of internet communication, but also on the intentions and skills of the internet users and their ideas about the comfort and the possibility of internet connection, the role of the subway ride in the broader planning horizons.

Key words City, porosity, digital porosity, subway, subway user, digitalization, digital connectivity, Wi-Fi, Saint-Petersburg, Moscow

JEL Classification: Z.

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Henry Miller in his book *Aller Retour New York* describes the rapid mechanization of New York in the early 1930s with apparent dissatisfaction: "The machines are driving them screwy. Nothing is done by hand anymore. Even the doors open magically: as you approach the door, you step on a treadle and the door springs open for you. It's hallucinating[2]". Enthusiastically embraced or no less fervently denounced, technologies and technological systems of such scale as electrification, water supply, telephone services, transportation networks, or more local, such as elevators and escalators, have played a vital role in shaping the modern city. Connecting, intersecting, overlapping with each other, they formed a new urban environment and a new quality of urban life. Technologies bound the city with wiring, water pipes, tram rails, while simultaneously creating a new density of urban space, enriching it with new sounds, smells, unusual tactile experiences: «In the age of unbridled industrialism and rampant urbanization cities were the cutting age of a new modern world, the place where people first experienced an environment»[3].

The expansion of digital technologies into everyday life on the whole, and urban life in particular, in the 2010s no longer caused as strong emotions as experienced by Henry Miller in connection with the advance of machines. The city's transition to digital regime nowadays seems self-evident. Researchers of urban phenomena are similarly likely to take the term "digital" very much for granted: while they undoubtedly recognize the radically new situation of urban environment, they seem reluctant to explore in details the meaning of this newness.

However, it is essential today to discuss the city and digital technologies, since the significance of spatial, temporal, and cultural contexts in digital society has never been cancelled, moreover, has been growing increasingly[4]. In this case urban environment, with its considerable technological possibilities, social and cultural diversity, fears and assumptions, intensive mobility and rhythms of speed, creates special conditions for the emergence and functioning of digital technologies, as well as their use.

By the early 2010s in Urban Studies, which relate rather to social geography than to software and technology studies, there have emerged several mutually

[2] Miller H. Aller Retour New York. NY: A New Directions Book, 1991. P.3
[3] Hard M., Misa T. (eds.) Urban machinery. Inside Modern European Cities. Cambridge, MA: MIT Press. P. 3.
[4] See, for instance: Van Dijk J. The Network Society. Social Aspects of New Media. Sage Publications, 2006. For a Russian-language discussion of contemporary city by Ekaterina Lapina-Kratasyuk, see: '"Interaktivnyi gorod": setevoe obschestvo i publichnye prostranstva megapolisa', in Brednikova O., Zaporozhets O. (eds.) Mikrourbanizm. Gorod v detalyah. Moscow: NLO, 2014.

complementary approaches to understanding digitalization. Firstly, digitalization is defined as the existence of information in the form of a code. Secondly, it is connected with the use of code-based software, putting in motion, accelerating or slowing down certain objects, spaces and processes[5], which constitute urban life. Finally, digitalization has been increasingly, even if by default, associated with Internet access and being on-line, although in this particular case a more precise term would be "connection" or "connectivity"[6], which creates a new type of relationship — almost permanent (ideally and in plans) availability of people and objects. Precisely this definition of digitalization will be important for me in this article.

Despite theoreticians' optimism, connection in contemporary cities is not a constant. It is not always available or of good quality. Not all urban residents, let alone visitors, can afford it (one only needs to remember the prohibitive prices for mobile or Internet-roaming). Moreover, the possibility to stay connected can be not only a benefit, but also a burden to contemporary urban citizens, which they might wish to get rid of from time to time. Finally, being on-line is not always favored by one's social surrounding, considered acceptable or even feasible — consider for example tightly squeezed passengers of public transport in the rush hour. Precisely the heterogeneity, limitations and disruptions of digital connectivity (technological, spatial, social and many other), which I define as *digital porosity*, will be the subject of further discussion.

At first glance "connection" and "connectivity" seem to be strictly technological features. In fact, they would be impossible without the technological infrastructure and the social infrastructure related to it — partly innovative, partly inherited from recent past — electrical services, technologies of mobile and Internet communication, maintenance specialists etc. And yet the discussion of connectivity is not limited to technologies or infrastructural capacities. Staying "in touch" depends no less on Internet and mobile phone users — their wish to be on-line, their skills, rules and conventions they create and share. Forgotten and underestimated, the human dimension of connection deserves detailed consideration, since the notion of ubiquitous city[7], where the continuity of

[5] See: Kitchin R., Dodge M. Code/Space: Software and Everyday Life. Cambridge, London: The MIT Press, 2011.
[6] See, for instance: Wellman B. Physical Place and Cyberplace: The Rise of Personalized Networking // International Journal of Urban and Regional Research. 2001. V. 25. № 2. P. 227–252; Malpas J. The Place of Mobility Technology, Connectivity, and Individualization // Wilken R., Goggin G. (eds.) Mobile Technology and Place. NY, London: Routledge, 2012. P. 26-38.
[7] See: Shepard M. (ed.) Sentient City. Ubiquitous Computing, Architecture, and the Future of Urban Space. Cambridge, MA: The MIT Press, 2011; Anthopoulos L., Fitsilis P. From Digital to Ubiquitous Cities: Defining a Common Architecture for Urban Development. IEEE 6th International conference on Intelligent Environments, IEEE Xplore, 2010. P. 301–306.

connection is guaranteed solely by means of technology[8], even to its originators seems more of a prospect than the actual situation.

Urban Underground and Internet Connection

Over the past few decades urban researchers have commented on the purposelessness of discussing the city "in general" and "on the whole": «[T]he process-based approach to the urban proposed here requires a fundamental reorientation of urban research. No longer conceived as a form, type or bounded unit, the urban must now be re-theorized as a process that, even while continually re-inscribing patterns of agglomeration across the earth's terrestrial landscape, simultaneously transgresses, explodes and reworks inherited geographies (of social interaction, settlement, land use, circulation and socio-metabolic organization)»[9]. The understanding of the city as a process, of its constant transformation and reconfiguration poses a question: what elements and ways of assembling them, themselves quite changeable, constitute urban life at any given moment?

As a starting point for exploration of contemporary city's Internet connectivity in this article we have chosen underground railway. Why are "notes from the underground" an important way to understand the transformations of contemporary city? It has to be specified, though, that first of all the discussion will concern metropolises with large-scale underground railway systems, which contribute significantly to the creation of city everyday life and its imagery.

The importance of considering the interconnection, or rather, mutual overlapping of the "Internet" and "subway" is determined by several circumstances. First of all, both technologies play a crucial role in creating urban environment. Whereas subway with its rhythms and logics has been shaping the everyday of contemporary metropolis since mid-19th century[10], since the late 20th century the role of driving force comes to the Internet. Secondly, subway is a space of mass transit with multimillion flows of passengers daily, which makes it one of the most

[8] The term "ubiquitous computing" was introduced by Mark Weiser in order to denote the accessibility of a computer network from any point of space. See: Weiser M. Ubiquitous Computing // Hot Topics. IEEE Computer, 1993(Oct). Nowadays the term "ubiquitous city" is widely used in social science and urban planning, referring to the possibility for citizens, urban infrastructures, material objects, etc. to stay connected all the time. The possibility to stay connected is supposed to create a new quality of urban life.

[9] Brenner N., Schmid C. Towards a new epistemology of the urban? // City: analysis of urban trends, culture, theory, policy, action. 2015. Vol. 19 (2-3). P. 166.

[10] See: Hård M., Misa T.J. Urban machinery: inside modern European cities. MIT Press, 2008.

essential urban spaces, in terms of connectivity as well. It is hard to imagine that the status of subway as the main means of transport in big cities will undergo any changes, for in metropolises with their congested traffic and enormous distances it remains almost the single option of transportation the urban dwellers can rely on. Thirdly, over the past few years subway systems of world metropolises have been increasingly engaged in mobile and Internet connection, as a result of both the development of Wi-Fi technologies and the improvement of mobile communication. Comparatively recent inclusion of subway into the "accessibility zone" allows supposing that access to the Internet has not yet turned into an ever-present and therefore unnoticeable service, which means that citizens' reactions to these changes have not been forgotten, nor become a thing of the past. Fourthly, underground railway is a carefully designed space that, compared to the surfaces above, features considerably less spontaneous phenomena — thus the priorities and policies of functioning and growth are outlined here with more precision.

And last but not least, another circumstance is meant to emphasize the importance of analyzing underground railway and the Internet together. The experience of using underground railway is inseparable from the experience of urban life and the life of a contemporary person as a whole, since the use of underground is involved in broadest possible spatial, temporal and many other horizons and experiences, such as everyday planning and life plans in general, relationship to the city, other people, and technologies. The idea of complexity and multidimensionality of the underground, its irreducibility to the experience of rides only, has been a recurrent motive in my interviewees' comments:

> —Even when I switch completely to driving, I will continue using subway from time to time… Because you feel differently there. A kind of retro, you know.
>
> —You mean it's a sort of urban theme park for you?
>
> —Well, yes, an urban theme park (laughs) (Saint-Petersburg resident, male, aged 22)

The following discussion of digital connectivity and disruptions in contemporary city is based on the results of the research project "Underground Railway: Ageing Technology and its Contemporary User", conducted in 2015-2016 in Moscow and Saint-Petersburg. The research involved a series of 30

interviews, 4 go alongs, an analysis of publications on the topic, thematic web-sites and groups in social networks. Being a space of transport mobility, subway coincides with mobility of a different kind — that of connection.

Digital "mobilization" and the problem of connectivity

Staying connected is not only a technical possibility, but also a choice of contemporary citizens taking decisions as to when, where, how long and what for it is worth being on-line. This choice depends on many circumstances and is not limited to a divide between "digital natives", who are used to being connected since early childhood, and "digital migrants", who are only gradually discovering the Internet:

- Nowadays mobile Internet is available on many phones. Why don't you want to use it?

- Well, to start with, I don't find it necessary. It's enough for me to use it at home (Saint-Petersburg resident, female, aged 19).

My phone is not a smartphone. I don't have this, Lord, how do you call it? An iPad, that's it. I've told you that I work days long in front of a computer (Moscow resident, female, aged 58, doctor)

Paradoxically, it is precisely the development of technologies that has significantly increased the role of subjects and their decisions, since "personality" of devices — their orientation at individual usage (which considerably complicates shared usage), the ability to accumulate the owner's interests and preferences, to reflect his or her identity — has if not provoked, at least supported a new spiral of individualism[11].

Apart from having a wish to do so, staying connected requires of citizens to perfect their skills and techniques constantly. "If you want mobile Internet — be mobile yourself, and certainly get to know the city" — this is how advice of an experienced Internet user might have sounded in the late 1990s. A little over a decade ago the continuity of Internet connection was created through carefully planned itineraries of a city dweller, who would move from the computer at home

[11] See: Williams R. Mobile Privatization // du Gay P. et al. Doing Cultural Studies: The Story of the Sony Walkman. London: Sage, 1997; Gergen K. J. The challenge of absent presence // Katz J.E., Aakus M. (eds.) Perpetual contact: Mobile Communication, Private Talk, Public Performance. Cambridge: Cambridge University Press, 2002. Pp. 227-241.

into an Internet café, from the Internet café to the computer at work, and to other places with Internet access. In the 2000s mobility of the Internet is achieved not so much through the resident's maneuvering, as by means of technological capabilities, such as the mobility of connection and portability of electronic devices. The appearance of wireless Internet connection has literally unleashed the user[12], as it allowed leaving behind cumbersome coils of wire and chargers occasionally getting unplugged, and gave an opportunity to forget about once popular Internet cafés or staying in the office after work in order to reap all the benefits of broadband. In these circumstances the user's independence from a space concentrating the capabilities of Internet connection has increased considerably, though was not fully achieved.

The 2010s have become a watershed in the development of mobile Internet connection all over the world. Since 2013 the number of tablets sold has been for the first time bigger than that of laptops, while the number of smartphones exceeded that of mobile phones without Internet connection[13]. Current changes convincingly testify to "mobilization" as a global tendency, namely to the increase in the number of mobile Internet users as well as in the amount of time spent on-line from mobile devices[14].

The creation and spreading of portable digital devices is not the only condition of digital mobilization, which is to a no lesser extent defined by the presence, quality and availability of Internet connection. The aim of making connection an abstraction devoid of any characteristics but ever-presence matches the ideology of connectivity, which proceeds from the assumption that connection always exists, although reality (even in the most technologically "advanced" countries, where the future of digital technologies is visible like in a magic crystal ball[15]) testifies to the contrary, reminding from time to time of technological and financial restrictions, of situations when it is inconvenient of simply forbidden to be on-line.

[12] See: Casey E.S. Going Wireless: Disengaging the Ethical Life // Wilken R., Goggin G. (eds.) Mobile Technology and Place. New York, London: Routledge, 2012.
[13] Internet Society Global Internet Report 2015. Mobile Evolution and Development of the Internet. Accessible at: http://www.internetsociety.org/globalinternetreport/assets/download/IS_web.pdf
[14] While in 2012 the average amount of time spent by a user in mobile Internet made up 74,4 minutes per day, in the second quarter of 2014 this figure reached 108,6 minutes per day, i.e. grew nearly by half, according to Statista.com. http://habrahabr.ru/company/mailru/blog/200358/ (in Russian)
[15] See: Ito M., Okabe D., Matsuda M. (eds.) Personal, Portable, Pedestrian. Mobile Phones in Japanese Life. Cambridge, London: The MIT Press, 2005.

Internet users are far from sharing the optimism of theoreticians who speak about the permanent and total Internet connection. While contemporary technologies overlap and reinforce each other, as in many cases there is a possibility of choosing which Internet to use: wired, Wi-Fi or mobile, users are not guaranteed against interruptions of connection, its low quality or temporary unavailability.

Multiple dimensions of Internet connection and digital porosity

Users are the first to feel numerous limitations and disruptions of connectivity: technological, material, spatial, social, bodily, and discursive. An optimistic vision of contemporary technologies' ubiquity: «Walls, doors, gates, and distances still frame and isolate encounters, but communications media increasingly trespass on the situations that take place in physically defined settings»[16], — doesn't stand up to the facts of reality, at least in Russia. Thus, a strained "Can you hear me?" or "I can't hear you!" becomes a common refrain of a conversation over a mobile phone (with the help of special apps, or without them).

The "feeling" of connection is no metaphor. Connection in all its imperfections is sensed acutely by the body, when a mobile phone user or Internet seeker constructs a complicated choreography of calls or Web access. For instance, when browsing a forum of a recently built house, the eye inadvertently singles out the new inhabitants' complaints: "It's only possible to speak on the balcony or pressing against the window, together with the phone (due to the poor quality of mobile connection - OZ)"[17].

Despite the constant improvement of mobile connection, users regularly have to better their skills and renew their knowledge in order to stay on-line. Many of them (especially the young) are increasingly experienced in balancing in search of the most accessible and convenient, in every sense of the word, communication conditions[18]. They switch from one tariff to another, from mobile to stationary Internet or Wi-Fi, move from one space to another, and try different devices.

[16] Willis K. Sensing Place: New Media Technologies and Urban Space // Frers L., Meier L. (eds.) Encountering Urban Places; Visual and Material Performances in the City. Ashgate Press, 2008.
[17] The forum of a residential block "Tsentr-2" in the city of Zheleznodorozhny, Moscow Oblast. Accessible at: http://centr-2.com/index.php/topic/1361-megafon-sotovaia-sviaz/
[18] See: Mascheroni G., Ólafsson K. The mobile internet: access, use, opportunities and divides among European children // New Media and Society. 2015. Vol. 17 (1). Pp. 1-23.

Consequently, the continuity of connection in many cases is achieved through users' successful maneuvering, sharpened transition skills, rather than perfection of technologies, which, according to theoreticians, create a seamless city. This partly reminds of the 1990s situation, when a relative continuity of Internet connection was preserved by means of the users' knowledge about places with Internet access and skilful planning of routes. The continuity of transitions is proved by Russian and international statistics, according to which in the USA 42 % of Internet traffic on smartphones and over 90 % of Internet traffic on tablets is accounted for by Wi-Fi connections, and not mobile Internet[19].

By their actions and demands users, among other things, reveal spatial "gaps" and shortcomings of connection. In particular, users' complaints make obvious the predominantly "horizontal" development of connection and the weak "vertical" connectivity — that between under- and overground spaces: subway or the sky. The omission of particular zones underlines the spatial character of connection, and repeatedly dispels the notions of its ubiquity and constant availability. Gradually, thanks to users' insistence, which turns out to providers' profit, there happens an expansion of digital space by means of inclusion of the so-called "dead zones". While the advent of mobile communication, and then Internet, into the underground is rapidly becoming an urban habit and an inherent part of rides, mobile connection and Internet available on flights since 2008 [20] still remain exotic and a miracle of technology: "When the service was introduced first in the United States in 2008, it was seen as a miracle more impressive than turning water into wine"[21].

Connecting particular spaces to mobile communication and the Internet is determined not only by technological capabilities, but also by their ranking — the notion of these spaces' and territories' value. The idea of the spatial dimension's significance seems quite evident; however, it tends to be underestimated by analysts, who prefer to discuss digital inequality or digital divide (with regard to connection) mainly in social, and not in spatial terms.

On the whole, the absence, interruptions or low quality of connection registers the situation that I propose to name *"digital porosity"*. Porosity in this case should

[19] http://www.economist.com/news/science-and-technology/21632739-wi-fi-hotspots-become-ubiquitous-who-needs-cellular-wireless-when-wireless-worlds

[20] Internet connection was first introduced by American company Gogo in 2008 on American Airlines flights. See: http://www.gogoair.com/history

[21] Bilton N. The Sorry State of Inflight Wi-Fi // The New York Times. January 21, 2016. Accessible at: http://www.nytimes.com/2015/01/22/style/the-sorry-state-of-in-flight-wi-fi.html?_r=0

be understood metaphorically. It reflects the user's viewpoint and allows feeling the heterogeneity of connectivity, when spaces and circumstances of "concentrated connection" are interspersed with as perceptible "digital gaps" — lowering in the quality of connection, or its complete disappearance. Anthony Townsend in his book «Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia» points out urban digital environment's dependence on mobile communication networks' occupancy. Thus, emergencies cause an avalanche of calls which brings down the network, as it happened during 9/11 events in New York, when only one out of twenty calls reached the recipient[22]. Therefore, digital gaps and points of connectivity are constantly reconfigured and often mutually reversible.

Already in the early 2000s Ash Amin and Nigel Thrift suggested using porosity as one of the basic metaphors to describe contemporary city life, noting that "transitivity/porosity is what allows the city fashion and refashion itself"[23]. Considering the city's porosity Amin and Thrift were inspired by Walter Benjamin's descriptions of the city: "Porosity is the inexhaustible law of the life of this city, reappearing everywhere", including how "building and action inter-penetrate in the courtyards arcades and stairways… to become a theater of new unforeseen constellations. The stamp of the definite avoided"[24].

Productive as this metaphor seems, so far it has not made its way into urban researchers' vocabulary. At the same time the term "porosity" is widely used in biology, medicine, chemistry, physics and many other sciences and applied engineering. In this case porosity is defined, classified (for instance, singling out penetrating, blind, closed pores), measured with special equipment, becomes subject to influence (decreasing or increasing in effect).

A strict definition and classification of porosity doesn't seem as fruitful for urban studies. On the contrary, a metaphorical use of porosity, its openness to interpretations can become useful for understanding a changing city. As far as associations are concerned, porosity resembles an absorbing sponge, which is easy to hold in one's hand, squeezing or stretching when necessary, and which can take on multiple forms[25]. Such porosity differs from a more large-scale, fixed and stable porosity of rock formations or materials which habitually come to mind when urban porosity is mentioned. Above all, such "sponge-like" porosity is far more

[22] Townsend A.M. Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia. WW Norton & Company, 2013.
[23] Amin A., Thrift N. Cities. Reimagining the Urban. Cambridge: Polity Press, 2002. P.10.
[24] Benjamin W. Naples // One Way Street and Other Writings, London: Verso, 1985. P. 169.
[25] My thanks go to Yana Krupets for her insightful suggestions on interpretation of porosity.

involved in everyday life, commensurate with human beings and, at the end of the day, is largely dependent on their actions.

Ambivalent as it might be, the metaphor of porosity, however, can suggest the direction of exploration. Even the statement of general research questions, such as: what can contribute to decreasing or increasing of porosity? What is absorbed by the porous structure? — will be conducive to a transition from contemplating a graceful metaphor to understanding of logics of porosity's existence.

Being a condition of contemporary city, digital porosity does not remain a constant. It can decrease under the influence of structural factors: the improvement of Internet connection; a change to construction materials that allow for a better conduction of signals, a necessity of which is highlighted by modern architects; realization of policies changing/fixing the value of particular spaces, and many other things. At the same time, digital porosity depends on citizens' wishes — their desire to stay connected. A change in porosity is often a multidirectional and poorly coordinated process, considering the number of its participants. The further discussion will touch upon expansion of Internet connection into the "urban underground" and citizens' response to the increasing connectivity of urban space.

Wi-Fi-ization Policies

Digital connectivity is supported by mobile and stationary technologies. According to expert evaluations, Wi-Fi — wireless Internet connection active within a particular zone — is a leading means of mobile Internet delivery. Wi-Fi's popularity relies on its ubiquity: it is used at home, in public and transit spaces — means of transport, cafés, shopping centers, railway stations and airports, libraries, hotels, etc.[26]

With much certainty we can speak of various policies of Wi-Fi-ization: Wi-Fi as a public good and resource of democratization, Wi-Fi as an economic resource, Wi-Fi as a symbolic value. Possessed of essential differences and perceived and competing, these policies, however, can be combined in certain proportions and circumstances, or melt into one another.

[26] http://habrahabr.ru/company/mailru/blog/200358/ (in Russian)

Wi-Fi is always related to a specific space. The very fact of its presence points to the significance of the place, which makes it in a certain sense similar to memorial tablets, which leave no doubt as to the importance of a certain space. At first glance it might seem that the geography of wireless Internet is universal. The existence of Wi-Fi facility in such spaces as cafés, libraries, hotels, railway stations is evident and corresponds to certain international assumptions concerning public spaces. However, the presence of Wi-Fi in sport venues, so typical of North American and Australian cities[27], gives and opportunity to feel the specifics of urban spaces geography in particular countries.

The appearance and wide spreading of free Wi-Fi in European and American cities in the second half of the 2000s has heightened the optimism of media analysts, who saw in it a major tool for development of urban public spaces, forms of citizens' participation and democratic institutes in general[28]: "Internet access in public spaces may reshape the public realm. Because of its location, it may revitalize, repopulate, and improve the safety of public spaces. Because of the electronic connectivity it offers, it may reduce social inequalities and increase the use of public spaces. As a result of the diversity of those who are co-located, it may increase social cohesion, tolerance, and exposure to diverse messages. Given that participation in diverse physical and virtual spaces can contribute to democratic engagement"[29]. Such vision was based on the perception of Wi-Fi as a public good provided by municipal or state structures.

Sometimes paralleling the policies of open Internet access, sometimes replacing them, the policy of Wi-Fi-ization as one of the key competitive advantages of various urban spaces was formed. In this case the development of wireless Internet was ensured by the efforts of private parties, structures, corporations, and in a number of cases municipalities. Internet connection was expected to be paid for by users or to contribute to attracting customers and increasing consumption in particular spaces, such as cafés, shops, museums, etc. Such policies often contradicted earlier declarations or actual moves toward free access, which caused strong dissatisfaction in users and proponents of the idea of the Internet as a public weal. For instance, closing up of the program of accessible

[27] See: Lambert A., McQuire S., Papastergiadis N. Public Wi-Fi. Space, sociality and the social good // Australian Journal of Telecommunications and the Digital Economy. Vol. 2(2). 2014.
[28] Plans of public spaces development could be coordinated with plans for development of electronic democratic forms of governance; alternatively, they could be independent measures, not going beyond the development of urban environment. Likewise the ideas of democratization of society by means of development of electronic forms of government, etc.
[29] Hampton K. N., Livio O., Goulet L.S. The Social Life of Wireless Urban Spaces: Internet Use, Social Networks, and the Public Realm // Journal of Communication. 2010, Vol. 60 (4). Pp. 701–722.

Internet in Berlin public transport was qualified as a step backward, both for the city, which is supposed to serve as an example to other German cities, and for the country as a whole[30].

The idea of Wi-Fi as a public good and economic resource is connected, above all, to its pragmatics. It is worth acknowledging that wireless Internet can have not only utilitarian, but also a symbolic value. Wi-Fi facility available in a certain space creates its added value in the system of symbolic production due to this space's promotion to the category of "modern" or "advanced", or reinforcement of this status. Thus, free Wi-Fi gradually turns into a must have of contemporary cities, a criterion of their (self-)esteem.

Decreasing digital porosity: policies of internetization of subway systems in Moscow and Saint-Petersburg

Installation of Wi-Fi facility in Moscow subway, completed by the end of 2014, was one of the most publicized and widely discussed recent events. Such attention does not seem unusual, as underground in Moscow is the main means of transport, with overall passenger traffic flow of around 9 million people per day. Unlike many other world subway systems, where the development of stationary Internet is prioritized, for Moscow Subway they chose a strategy of "Internet in movement", when being on-line is only possible in a moving train, and not on the platforms, in entrance halls or passageways.

The appearance of Wi-Fi was part of a complex of measures aiming at modernization and development of Moscow underground, including construction of new stations, renovation of trains, replacement of escalators, etc. It was a novelty, which directly or indirectly concerned each passenger of underground railway. From that moment on, everyone riding subway could get exasperated or excited with the availability of connection, or watch one's fellow passengers bending over the screens of their smartphones, or, finally, boost one's skepticism, playing a specially designed online game "Wi-Fi Catcher", where the main goal consists in managing to "catch" a Wi-Fi icon appearing on the image of a subway carriage before the doors close and the connection vanishes[31].

[30] http://www.grin.com/en/e-book/203175/the-implementation-of-free-wifi-service-in-the-german-public-transport»
[31] The game "Wi-Fi Catcher" is available at: http://xn----7sbbai3bbdbwul8e.xn--80adxhks/ (accessed on 08.03. 2016)

The installation of Wi-Fi facility in the underground was a costly, and yet acceptable option of the system's modernization. A creation of an accessible environment for passengers with limited mobility or making subway more comfortable would have been far more expensive and would have required solving much more complicated technical problems than laying cable and installation of routers. Therefore, Wi-Fi seemed the most practicable option of modernization, which provided highest possible PR effect and visibility of the innovation. The appearance of Internet connection on underground trains exceeded expectations even of Muscovites, who were used to available Internet. This sounded too good to be true, because previously the citizens had not encountered such wide coverage areas and had not had the opportunity to stay on-line while moving underground.

It can be supposed that the appearance of available Internet connection in the underground was a largely symbolic gesture. One of the major urban brands was in need of a "seal of excellence" from a different era. Having appeared in 1935, Moscow Subway from the very beginning became a symbol of urban modernization and a way of showcasing the successes of the new Soviet state. From the first days of its existence it was viewed as if not the best, then definitely the most beautiful and passenger-oriented underground railway system in the world. A new era threatened to turn Moscow Subway into an ordinary urban museum with open access and unlimited number of visits. It is for this reason that underground railway system needed effective ways to maintain its unique status; the introduction of wireless Internet that restored to Moscow Subway its former glory of an advanced technological system became one of these ways. The outstanding nature of this event, rather than passengers' convenience, is constantly emphasized by municipal authorities. Moscow Mayor Sergey Sobyanin relentlessly reminds that "free Wi-Fi in Moscow underground has no parallel in the world"[32]. The prevalence of symbolism over the pragmatics of wireless Internet development occasionally creates paradoxes, ironically described by Moscow underground passengers: "While there was Wi-Fi in the carriage, there was no Internet"[33].

Significant as it is for the city, Saint-Petersburg underground railway system, unlike its Moscow counterpart, has never been a symbol of the city or an important landmark. The decision to provide it with Internet connection involved several steps. At first, the main stake was placed on the development of mobile Internet,

[32] http://riamo.ru/happen_news_moscow/20160111/618729841.html (accessed on 08.03. 2016)
[33] Wi-Fi v metro Moskvy: tekhnicheskoe poslevkusie // Ridus [Electronic resource] — Accessible at: https://www.ridus.ru/news/156457

which could be accounted for by the desire of subway administration to avoid turning the underground from a means of transportation into its final destination: "The Head of Saint-Petersburg Subway Vladimir Garyugin has severely criticized this initiative: it will transform train carriages into Internet cafés where youth will be spending all their time, disturbing other passengers and occupying seats they are not entitled to"[34]. Later on the strategy has been reconsidered repeatedly. In 2013-2014 Wi-Fi networks were put into operation in testing mode at 38 stations[35]; this went virtually unnoticed, though, and afterwards the decision was taken to return to mobile Internet.

Wi-Fi-ization of Saint-Petersburg Subway at some point became part of a general policy aimed at internetization of urban space. As in Moscow, it was considered an important sign of modernization. In this context inappropriate quality of Internet connection became a symbol of the city's failure to meet rather abstract standards of contemporary urban life: "SPb Free Wi-Fi is not working! Neither in subway, nor in the streets. SPb Free Wi-Fi does not improve Saint-Petersburg's image, on the contrary — it is the city's disgrace. What will tourists think about the "adoption of modern technologies" in Saint-Petersburg, if free Internet pretends to exist, while in fact it doesn't"[36].

The inclusion of urban underground into the orbit of Internet connection, imperfect as it is, has contributed to decreasing the city's digital porosity. Has the expansion of access zone provided a sufficient basis for a transformation in usage practices?

Hiding, evaluating, planning: the ways of being on-line in Moscow and Saint-Petersburg underground

The diversity of ways, goals, and modes of connection and use of the Internet can be observed easily: it is enough to look around in a subway carriage at any time, it seems, but for the rush hour. Further on I would like to focus on three out of multiple scenarios of using Internet, which were described and shown to me by my numerous interviewees: "digital shelter", "digital periphery", and "digital planning". These cases exemplify subway passengers' choices. At the same time, they reveal a common logic behind underground users' actions — the ability to

[34] Wi-Fi nastupaet na metro // Fontanka. Peterburgskaya internet-gazeta [Electronic resource]. Accessible at: http://www.fontanka.ru/2013/12/26/165/
[35] http://ria.ru/spb/20140113/988989761.html (in Russian)
[36] Besplatnyi internet portit imidzh Peterburga // Internet-portal 812'ONLINE. [Electronis resource]. — Accessible at : http://www.online812.ru/2014/10/28/011/

control one's everyday life filling it with specific occupations, choosing emotional modes and the degree of involvement in events happening here and now[37]. Everyday life management includes a subway ride into broader horizons of planning and structuring the everyday:

> When I stopped taking subway, I suddenly realized that I don't read any more. And it's a terrible pity, because I don't see how I can now find time for reading (Moscow resident, female, aged 30, analyst)

The involvement of a subway ride into general plans and a wish to make use of one's transportation time does not cancel various restrictions: the rush hour, breakdowns and accidents, transport etiquette etc., which force a person to act within rigid scenarios. However, these scenarios' "rigidity" is not absolute, as even minimal choice leaves an opportunity to use it.

Discussing the use of the Internet as one of the features of a subway ride, I would like to point out that while some scenarios are more popular in Saint-Petersburg, others in Moscow, anyway they are related to the quality of Internet connection, the variety of situations in which underground users find themselves, and to a no lesser extent — to a person's desire to control their experience of the ride and their everyday life.

"Digital shelter". A subway ride fulfils this function when the quality of mobile connection or Wi-Fi is low, or the circumstances are unfavorable. Accustomed to fast and permanent connection overground, in a number of cases users will prefer to forgo browsing the Internet rather than battle against technical limitations and real or perceived threats to the safety of collective Wi-Fi access. Temporary Internet-abstention is favored by circumstances of the ride as well: dull light in the carriage, which makes it difficult to read; lack of free seats that would make browsing possible and pleasurable; unwillingness to turn the screen of one's device into a "shared object" — the focus of neighbors' excited attention. "Digital shelter" is a reaction not only to the inconvenience or imperfections of the underground, but also to the advance of digital technologies overground, where the Internet has infiltrated both the workplace and the space of the home. The complications or impossibility of using Internet have their benefits in terms of time management: in subway a person can do something they normally lack time for

[37] On managing urban everyday experiences, see: Bull M. Sounding out the city: Personal stereos and the management of everyday life. – Berg, 2000; Zaporozhets O. "Nastroit gorod na svoyu volnu": metropolitan i upravlenie gorodskimi opytami // Teoriya mody: odezhda, telo, kultura. 2014. Vol. 33. P. 143-161.

overground — take a nap, relax, closing one's eyes, or on the contrary — watch other people. Paradoxically, a crowded space becomes a place for privacy in the city, at any time except for the rush hour. Normally the idea of "digital shelter" arises at early stages of subway's internetization. Further on, underground passengers find it increasingly difficult to convince themselves of the necessity of a break.

"Digital periphery". Considerable improvement of connection underground heightens both the possibility and the desire to stay on-line. However, the development of connection is unable to change the situation completely: to give an opportunity to concentrate, to preserve the limits of one's place, to avoid occasional jostles, brushings, the train's abrupt movements. In this case the subway passenger relocates into the underground actions of lesser importance, requiring not much time or attention, such as: checking e-mails, reading news, using social networks, and many others. "Digital periphery" accommodate occupations which allow for a mistake or inaccuracy, such as an unintended "Like" in social networks. All important commitments are "elevated" overground:

- You said that subway is no space for mail. What did you mean by that?
- Well, that's obvious. There are people around anyway. The screen… I can even overlook some little thing. Sure sometimes I had to answer mail. There were mistakes there. And the addressee misunderstood the meaning completely. I mean I looked like I was a moron alright.
- Since then you take no chances, do you?
- If needs must, yes (Moscow resident, male, aged 28, production engineer)

Finally, the third scenario of using the Internet, which can be called "digital planning". This planning is also connected to the availability and quality of connection but it mainly covers the time spent underground. Namely, the presence of connection creates specific topography of the underground, highlighting "connected spaces" with more or less stable and fast Internet. In Saint-Petersburg Subway they are represented by entrance halls, escalators, and stations, in Moscow — by carriages:

> Well, I can switch on [my smartphone] on the escalator, to open an e-mail, mailing service loads gradually, or at the station (Sankt-Petersburg resident, male, aged 28, research fellow)

Interruptions in connection make Internet users develop quick reaction and specific skills. Thus, a subway ride turns into a carefully planned enterprise, which aims at managing to catch the connection:

> I plan it so beforehand that once I've written the letter, I sit and wait for the next stop to appear, so that I could send this letter. 'Cause I see that anyway there is no Internet, it won't get sent, 'cause this roundeling of a letter being sent does get on my nerves, 'cause I don't understand, did it go after all or not… You freak out it's not the station at once, dear me if we are not leaving and it has only just been found" (Sankt-Petersburg resident, female, aged 36, lecturer)

Nowadays "digital planning" is much more widely spread in Saint-Petersburg Subway with its distinct interruptions in connection in comparison with its Moscow counterpart, where there is an opportunity to move from one connection to the other relatively seamlessly.

On the whole, underground railway's digital porosity created by a range of conditions and circumstances is perceived both as a benefit — an opportunity to exit the rapidly expanding digital space temporarily, and as a nuisance which requires additional efforts and attention to the everyday precisely there where most people would prefer to avoid them.

Conclusion

The development of mobile communication and Internet connection is an inherent part of contemporary urban life. Digital expansion is largely determined by internetization policies, which define priority spaces, forms and intended social effects of spreading connection. The advancement of Internet does not only set the city in motion or solve practical tasks, it is also one of the most effective indicators of its modernity.

Despite the overoptimistic statements made by theoreticians and practitioners alike as to the total connectedness of the contemporary city, the facts point to its "digital porosity". An analysis of the underground allows understanding the circumstances and logics of continuities and interruptions. It seems that the map of underground railway system since recently has been supplemented with a carefully

scaled map of available Internet, at least in users' imagination. The new map obviously goes beyond passengers' experience and underground space, providing an opportunity to describe complicated configurations of connectivity. "Digital shelter", "digital periphery", "digital planning" — these and other manifestations of digital porosity make it possible to move from general statements to a description of a complex and multidimensional landscape of a contemporary city, keeping in mind the importance of the citizens' wish to support the new connectivity or disrupt it.

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