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STUDYING PATTERNS OF COMMUNICATION IN VIRTUAL URBAN GROUPS WITH DIFFERENT MODES OF PRIVACY

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This paper is concerned with online communication of apartment buildings' residents on general purpose social networking site (SNS) VKontakte (VK), focusing on how groups' participants use instruments of SNS to separate place-based discussions and participation in wider community initiatives. With the help of topic modeling algorithm LDA, we analyzed posts collected from online groups related to apartment buildings in St. Petersburg to reveal differences in communication in open groups and restricted access groups. We also looked at overlaps between local groups of apartment buildings and city-wide movements. Our study shows that inside SNS there is a functional differentiation between restricted access groups and open groups, which have different audiences and communicative strategies. Restricted access (private) groups play an important role in the formation of neighbors' communities of trust and, supposedly, can be useful substitutes of face-to-face interaction for people moving into new buildings. Open (public) groups function as public forums for fostering neighbors' cooperation and attracting the attention of the broader public to local issues and conflicts.

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Introduction

Neighborhood or community-oriented social media simplifies interaction among residents within shared urban environments by decreasing transaction costs of communication which can be sometimes high in offline reality (K. N. Hampton, 2010). Usage of local Internet platforms strengthens the ties formed between residents (K. Hampton & Wellman, 2003) and facilitates the collective efficacy of local groups that leads to enhancement of citizen engagement and involvement of neighbors in different place-based activities (Kavanaugh, Carroll, Rosson, Zin, & Reese, 2005). There is a vast variety of local social media allowing neighbors to interact and cooperate in order to solve common problems (Kavanaugh, Perez-Quinones, Tedesco, & Sanders, 2009).

Most of the researchers focus in their studies on specialized online platforms (forums, intranets, dispersed blogs) which were created especially for place-based communication. These websites are usually equipped with special tools for verification of participants and support of physical territorial boundaries. These features provide secure space for neighbors not allowing "outsiders" (people who do not live in a certain neighborhood) to affect the privacy of their communication (Johnson & Halegoua, 2014; Masden, Grevet, Grinter, Gilbert, & Edwards, 2014). But, at the same time, verification tools makes cooperation between different neighborhoods, facing similar issues, difficult, as people can be involved only in one forum group/intranet relating to the place where they live (Masden et al., 2014).

Apart from specialized platforms, people living nearby to each other can communicate on general purpose social networking sites (SNS) (such as «Facebook» or «Twitter»). These SNS have no integrated mechanisms to support territorial differentiation, and participants of online communities, formed on SNS, decide themselves if there is a necessity to sustain private communication inside the group or not. Currently, research on place-based communication on general purpose SNS is not developed well, but some studies, which have touched this topic, claim that "location-agnostic" social media are not appropriate for communication of neighbors because of the lack of privacy on these platforms (Johnson & Halegoua, 2014; Masden et al., 2014).

Contrary to Europe and United States, in Russia, specialized place-based platforms are not actively used, and the biggest part of the communication of urban residents happens inside general-purpose SNS «VK» where people can create open as well as private online groups. The main goal of this study is to reveal how functions of the groups differ in conditions when residents decide themselves if information from their community is accessible for everyone on

the website or only for selected users. As it was noted above, such platforms were not massively studied by our colleagues, and studying online groups on «VK» will allow us to better understand the role of privacy in the online communication of urban residents and reveal how privacy mode relates to the communicative activities of their members.

In this paper, we continue studying communication of apartment buildings' residents inside online groups formed on VK (Voskresenskiy, Sukharev, Musabirov, & Alexandrov, 2014). The previous study included only exploratory analysis and did not differentiate observed online groups on the base of privacy. The main aim was to observe only some common patterns of communication.

Literature review

Place-based online resources and social ties

One existing direction in studying place-based online resources focuses on how virtual communication relates to social ties forming between urban residents in offline reality. Hampton and Wellman (2003), in their famous study of Netville, compared patterns of communication among a group of residents who had got access to high-speed Internet with a non-wired group of residents. According to the results of their study, wired residents were more engaged in relations with their neighbors than non-wired ones. Researchers argued that asynchronous communication provided by the Internet had a positive impact on the formation of ties between neighbors as they were not obliged to be in the same place to interact with each other. Hampton (2007) further observed some distinctions in the use of the Internet for different types of neighborhoods and showed that the apartment buildings exhibited the lower level of participation and involvement than suburban neighborhoods with separate houses.

Social media can alleviate the effects of isolation in apartment complexes especially by helping new neighbors to create communities when moving into new buildings. Daly, Dahlem, and Quercia (Daly, Dahlem, & Quercia, 2014) found that the participants' activity in the groups formed for new developments is higher than the activity in the groups for old developments. Authors concluded that, because of the absence of pre-existing offline communities, residents of new developments use forums as a "source of support and information".

Place-based online resources and collective action

There is a big set of research which considers the impact of online resources on the cooperation of urban residents. According to recent studies, online communication fosters the

involvement of regular residents in collective action directed to improve or sustain the territory in which they live and strengthens their willingness to take part in the life of local community (Capece & Costa, 2013; K. Hampton & Wellman, 2003; Kavanaugh et al., 2005; Li & Li, 2013). Afzalan and Muller (2014) claimed that online forums simplified consensus-building process organized by active residents of the neighborhood and allowed them to cooperate in a more effective way than in the case of offline discussions. Apart from that, they found that collective actions could be an essential element of infrastructure connecting neighbors and urban developers.

Various scholars highlighted a significant role virtual space played in tie formation between different initiatives. Gladarev and Lonkila (2012) discovered that participation in local protest activities against fill-in constructions, supported by online groups, motivated some members to become involved in other forms of civic activism which were less connected with their personal interests and related to city-wide context. Huang in his research on hyperlink networks of homeowner forums in China (2015) named geographic proximity and shared issues among factors of tie formation between forums. Besides, Huang suggested that online communication allowed active neighbors' communities to use the experience of other communities to improve own strategies of solving problems.

Types of online place-based platforms and privacy

Some studies focus on the design of platforms and privacy issues connected with online communication. Arnold, Gibbs, and Wright (2003) in their work, concerned with the case of the unsuccessful intranet, supposed that the structure of intranets was not appropriate for organizing communication between neighbors because the absence of anonymity "works against private discourse between individuals". Foth and Hearn (2007) claimed that discussion boards and intranets were more appropriate for collective interactions directed to discuss place-based topics, whereas private emails and instant messaging were more often used in socializing, which was associated with more private forms of communication.

In some works, there is a claim about disadvantages of SNS as a platform for place-based communication. According to Johnson and Halegoua (2014), low level of SNS usage for communication with neighborhood could be explained by the lack of perceived intimacy on SNS and by the fact that part of residents has no access to social media. Masden with colleagues (2014) considered the problem of privacy on specialized SNS and concluded that territorial boundaries represented inside such online resource and the presence of verification system

allowed users of the site to feel safe and secure at the level, which could not be reached on global location-agnostic SNS like "Facebook".

Research questions and aims

As we can see from Literature review, the privacy plays a significant role in activity of place-based online communities. Researchers explain inefficiency of platforms in supporting neighbors' interaction by the lack of privacy on them (Arnold et al., 2003; Johnson & Halegoua, 2014; Masden et al., 2014). But, at the same time, Foth and Hearn (2007) note that needs in privacy can depend on the interests of users, and if residents use online platform not for socialization, privacy features play a less important role.

All these works come from the qualitative perspective and are based on the interviews with users about privacy on the platforms. Our aim is to extend this field of research and focus not on individual experiences of users but on differences in communication patterns and levels of activity in the groups with different privacy modes.

RQ 1. How do communication patterns and activity level differ in private and public place-based online communities?

According to some works (Daly et al., 2014; Foth & Hearn, 2007), patterns of communication inside online group depend on the characteristics of the neighbors' community. Residents of new buildings try to create communities of trust and help each other, whereas online communities in older buildings are more often created because of some external issues. To explain better, why some groups have restricted access, and others are open, we also stated research questions about the connections between physical characteristics of buildings, age characteristics of groups' audiences and privacy modes.

RQ 2. How do physical characteristics of observed buildings relate to the privacy of communication inside online communities?

RQ 3. How are age characteristics of participants connected with privacy modes of the observed groups?

Masden and her colleagues (2014) noted that an implementation of verification tools can have negative consequences not allowing interested activists from different neighborhoods to cooperate. At the same time, Gladarev and Lonkila (2012) suggested that active participation in one protest action supported by online community created on SNS can stimulate a resident to be involved in a wider range of civic activities. We want to check on quantitative material how

many users, involved in local activism, also partake in other initiatives connected with improving the urban environment. The focus will be put on ties forming between local groups apartment buildings and groups representing city-wide urban initiatives which activity covers entire districts of the city.

RQ 4. How do observed local groups relate to other urban online activities formed on the SNS?

Data and methods

We study the activity of virtual groups created by residents of apartment buildings in St. Petersburg on VK. VK is one of the most used social networks on the territory of ex-Soviet republics with more than 200 million accounts (Cosenza, 2015). VK allows users to create online groups where they can discuss common issues and interests or exchange information. Each online group has a discussion board, where participants can create subtopics for collective deliberation, and "walls", which give users a possibility to communicate in a continuous message flow. Administrators of groups are permitted to make their group restricted or open in terms of access. In the case of restricted access online groups, joining participants must get approval from the administrator.

To collect the data, we searched for online groups related to apartment buildings using the list of all street names in St. Petersburg and the list of keywords (like "house", "resident", "HOA", etc.). We filtered manually the set of 2232 found groups excluding spam and irrelevant search results (e.g. online groups of shops or beauty salons situated in apartment buildings), leaving 193 open and 232 restricted access online groups. A large part of restricted access groups did not allow us to join as they had very strict rules for participation (administrators approved only building's residents) or did not consider our requests -- these groups were not included in the analysis. Thus, 193 open and 41 restricted access groups were left for analysis.

For these groups, we collected text data from "walls" and "discussions" with the help of VK API. A large part of text messages seemed to be spam messages (advertisement, various commercial services), which are irrelevant for analysis. We manually coded random sample of 2000 messages as spam or non-spam and applied algorithm of binary classification "Random forests" (Breiman, 2001) to filter all collected messages. Algorithm found 12k spam messages in restricted access groups and 18k spam messages in open groups. After deleting all spam messages, we had 76k posts from "walls" and 134k posts from "discussions" in our base. Later,

we cleaned our data set from punctuation, numbers, symbols and applied lemmatization using MyStem (Segalovich, 2003).

For the revealing topic structure of analyzed online groups, we applied algorithm of topic modeling Latent Dirichlet Allocation (LDA) (Blei, Ng, & Jordan, 2003). In the current research, we used Twitter-LDA, a modification of Latent Dirichlet Allocation algorithm devised specifically for short messages (Zhao et al., 2011), because posts on the "walls" and "discussion boards" are often short. All messages in the database were used as separate documents for LDA. We varied the number of topics from 20 to 200 and found that 100 topics gave the most interpretable results. After interpreting topics, we combined them into consistent theme groups for further analysis.

To find more about the audience of open and restricted access groups, we also analyzed age distribution of the participants. As most VK users hide personal information, we got dates of birth only for 18775 of 57686 (32.6 %) participants.

As we noted above, one of the directions of our study was to reveal if the SNS fosters the formation of ties between members of communities with common issues. For analyzing the connection between local groups of apartment buildings' and city-wide urban movements, we collected ids of participants of apartment buildings groups and members of the ten biggest city-wide initiative groups in St. Petersburg which focus on improving the urban environment. After that, we counted share of overlapping participants between local groups and city-wide groups.

In addition to online data, we parsed information about physical characteristics of observed apartment buildings from website "Our Saint Petersburg" maintained by authority of the city. We collected information about years when analyzed buildings had been constructed. Also, we added information about a number of stories and flats in the buildings. These variables were used to better understand specific features of studied buildings. Knowing the size of the house, we can suggest if this house is a traditional building or it is a housing complex having developed infrastructure on the internal territory. Even though this website included the most detailed data on all constructions of the city, information was not found for 10 % of buildings.

RESULTS

Physical characteristics of buildings and privacy of communication

Having suggested that online groups with various levels of privacy represent distinct types of apartment buildings, we compared sizes of observed houses (number of flats and stories) and years of their construction.
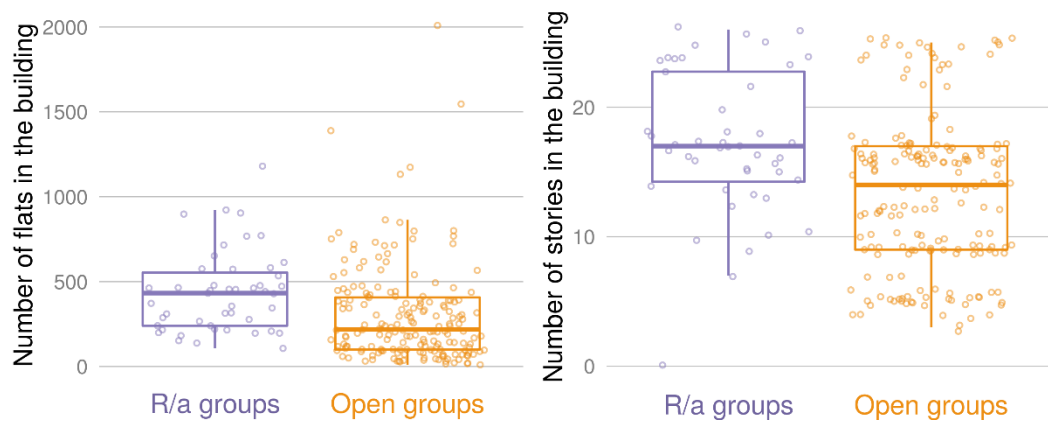

Fig. 1. Number of flats and stories in the buildings

Comparison of buildings' sizes showed that buildings, represented by online groups with restricted access, are significantly bigger than buildings residents of which prefer a public type of communication. According to Fig. 1, buildings with restricted access online communities have significantly more flats (Mdn = 432) than buildings with open groups (Mdn = 219, W = 6064.5, p-value < 0.01). Besides, Fig. 1 shows that users of restricted access groups live in higher buildings (Mdn of stories' number = 17) than users of open groups (Mdn of stories' number = 14, W = 5855, p-value < 0.01).
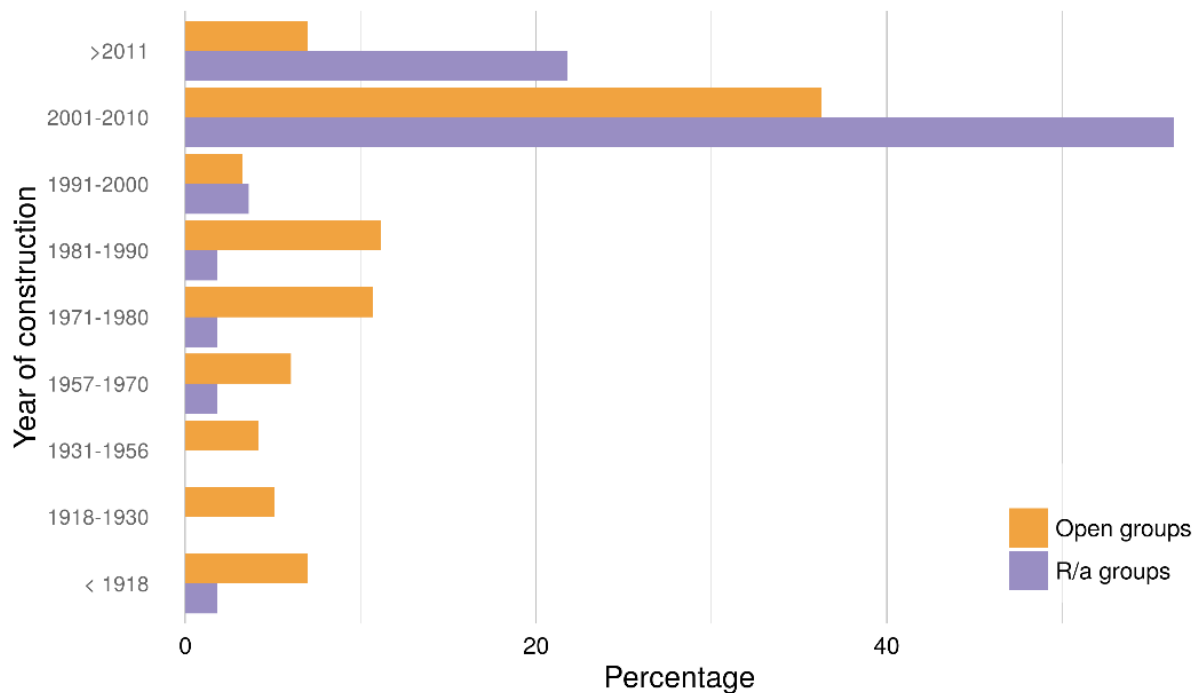

Fig.2.Years of buildings' construction

Apart from distinctions in sizes of the buildings, we found that distributions of years of construction for two types of groups differ significantly (X-squared = 38.489, p-value < 0.01). As we can see from Fig. 2, among buildings represented by open groups, there is a relatively big set of those which had been built before 1991. At the same time, restricted access groups have very low percentage of old buildings and are mostly created by residents of new-built constructions. Especially, it is worth noting that there is a big part of restricted access groups related to buildings constructed after 2011, contrary to open groups which are poorly presented in this group of buildings.

Considering observations connected with sizes of houses and years, we suggest that a big part of restricted access groups is created by residents of large housing complexes active construction of which started in the 1990s in St. Petersburg and, nowadays, they are one of the most popular forms of new-built houses in the city. Usually, housing complexes consist of some tower blocks which are connected by infrastructure including little squares, playgrounds, and other shared places.

Differences of activity in online groups

Based on the descriptive statistics (Tab. 1), we assume that in restricted access groups there is a higher level of activity than in open groups.

Tab.1.Basic properties of groups

	Groups	
	Open	Restricted Access
Groups		
Total #	188	41
Posts		
Median	2035	7237
2nd quartile	602	3965
3rd quartile	3965	21363
Participants		
Median	64	344
2nd quartile	32	174
3rd quartile	172	678
% who wrote at least 1 post	24	34

The number of posts in online groups differs dramatically: 41 restricted access groups have more posts (Mdn = 7237) than 188 open groups (Mdn = 2035, W = 6829, p-value < 0.01). Apart from that, we can see that the number of participants is substantially higher in restricted access groups

(Mdn = 344) than in open groups (Mdn = 64, W = 6232, p-value < 0.01). Thus, we observe here that mode of privacy of online group relates to the level of activity and number of participants.

Due to descriptive statistics, we can see that in observed groups a prevailing number of participants does not actively participate in discussions. As Kotus and Hlawka showed in their study (2010), in urban-related forums there are more "lurkers", who are passively interested in discussions or actions connected with the territory in which they live but do not engage in them. This is true in our case for both types of groups, though we see that in restricted access groups there are more participants who have written at least 1 post (34 % of participants) than in open groups (24 % of participants). We can suppose that in the case of open groups this inequality between the number of participants and the number of those who actively participate in the life of community could be explained by the presence of spam bots in these groups.

Age distribution in online groups

Distribution of age brackets for observed groups is presented in Fig. 3. Applying G^2log-likelihood ratio (Agresti, 2007), we found that age groups "18-29" and "30-39" are more presented in restricted access groups, whereas age groups "40-49" and "50+" prevail in open groups (p-value < 0.01). These differences can relate to the fact that restricted access groups are mostly related to new-built constructions in which big part of residents is young families.
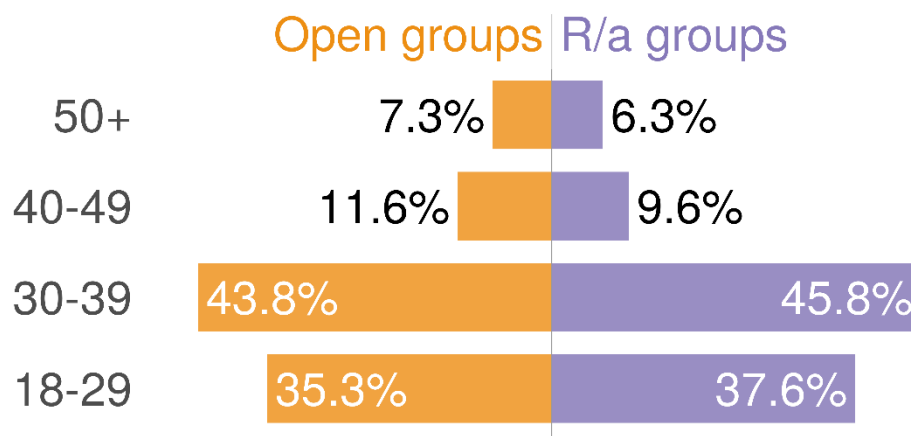

Fig. 3. Age distribution in restricted access and open groups.

We can also assume that this age imbalance can partially explain the higher activity in restricted access groups in comparison to open groups. Supposedly, young participants are more tech-savvy and more often use social networking sites. It is interesting enough that such distinction can lead to inequalities in managing buildings between these age groups.

Themes discussed in online groups

In the process of interpreting results of LDA, we manually coded 100 LDA topics into 9 coherent groups (Tab. 2). It worth noting that 8 topics accounting for 3.2 % posts were not possible to interpret.

We found that some groups of topics are more about various common problems demanding for the cooperation of neighbors, and other ones are more concerned with personal intentions of residents.

Initiative theme. Discussion and cooperation against management companies or homeowner associations (HOA) performing their functions in an unsatisfactory way. Apart from that, in this theme, there are topics about elections organized by residents with the purpose to re-elect a management board of the building or choose a new management company. *"So...Is it legal? No, it is not legal! Here's the document based on which "X" is the management company. Possibly, you personally voted for them. But I and 10 of 10 neighbors, surveyed by me, did not vote!"*

Tab. 2.Groups of topics

Topic groups	#	Example topic keywords
Initiative theme	17	HOA, to solve, money, court, meeting, chairman
Building improvement	18	house, neighbor, trash, stairwell, elevator, floor
Protest theme	2	playground, court, building, administration, place, problem
Socialization	2	fitness, neighbor, hello, to meet, dog, apartment
Mutual help	5	neighbor, to give away, needed, childish, thing, clothes
Building apartments	14	apartment, thanks, price, floor, to buy, contract
Parking	2	place, car, parking, building, to stay, to park
Children	2	school, class, child, kindergarten, mother, teacher
Repair	5	repair, apartment, design, price, sale, interior

Building improvement. Discussion and cooperation directed to improve building's state and its surroundings. The theme includes topics with residents' concerns about internal conditions of the building (e.g. heating, trash in staircases) as well as intentions of residents to renovate external part of the building (e.g. playgrounds, squares, parking places). *"The summer season will start soon, and alcoholics will come to our yard to drink here. How can we solve this problem? I suggest to removing all benches from our yard which are used by these guys for seating. What do you think about that? Let's action together!"*

Protest theme. Coordination of collective actions (meetings, signatures collection) against external threats (for instance, fill-in construction on the territory of buildings). *"Attention! TV shooting scene about our problem will be today at 12:30 PM on the playground. All of you who is free this time, please, go to the playground. Notify neighbors!"*

Socialization. Communication directed at forming new social ties between neighbors having common interests (sport, pets) or living nearby to each other. *"I will be glad to get acquainted with neighbors playing Russian billiards or ping-pong. Also, I will make your company for snowboarding or skiing in winter."*

Mutual help. Neighbors lend, give, or sell at a reduced price distinct items needed for everyday life. *"Is there anybody who is able to lend me faux Christmas tree for one week? I'm making an educational movie, and plot of it requires a Christmas tree. I live on the 4th floor."*

Buying apartments. Communication connected with moving into new buildings. This thematic group includes discussions of the construction process, conditions of new apartments and questions of people who are going to buy an apartment in a certain building. *"Did you get keys to your apartments? Will defects be fixed?"*

Repair. Questions and advice on repair work in the apartments. *"There are two toilets in my apartment. The second one is for guests. I do not have much need for it. I am going to make dressing room instead of this toilet. What do you think about this? Does anybody have similar room?"*

Parking. Discussion of parking rules on the territory of buildings and charges to violators of the rules. *"You have the choice where to park your car. But you should not think only about your own convenience."*

Children. Communication of neighbors having children (choice of school or kindergarten near the building); joint trips near home. *"Everybody who has children, let's walk together. My daughter is 8 months old, I am 23. Daughter is cheerful, sociable, and positive."*

Differences of communication in restricted access and open groups

We analyzed the differences in prevailing topics of open and restricted access online groups using G^2 log-likelihood ratio (Agresti, 2007). Considering the Holm-Bonferroni correction for multiple comparisons (Holm, 1979), we left 67 topics for which log-likelihood ratio was statistically significant (p-value < 0.05) in our analysis.
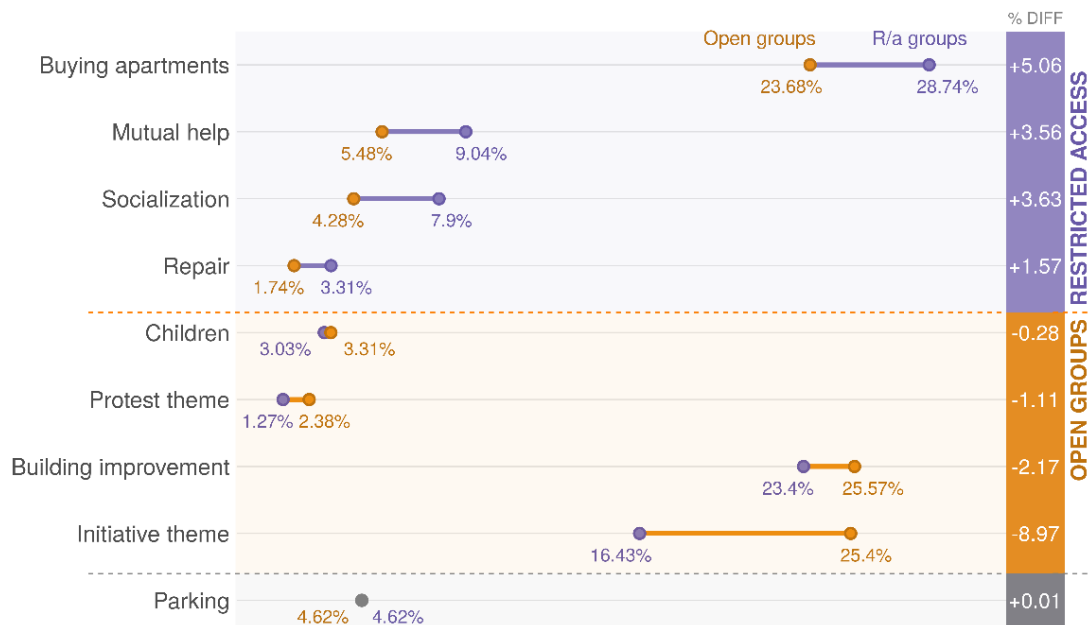
Fig. 4. Share of topics for restricted access and open groups

Fig.4 shows how the share of grouped topics differs for restricted access and open online groups. Not surprisingly, such thematic groups as *Buying apartments* and *Repair* prevail in restricted access groups which are often related to new-built constructions which have a big flow of newcomers. Also, participants of restricted access communities more actively socialize and help each other. This feature of communication let us speculate that such groups can play an important role in the formation of new communities.

In open groups, the most prevailing grouped topics are *Initiative theme* and *Building improvement*. Apart from that, we may observe that such communities are more often used for organization of collective actions against external threats (*Protest theme*). It is difficult to explain why the thematic group *Children* prevails in open groups, but we should also consider that percentage difference of shares of this theme for two compared groups is very small (0.25 %). Thus, we can suppose that functions of open groups differ from restricted access groups, and open groups are mostly used for residents' cooperation.

And only *Parking* has no statistically significant percentage difference between restricted access and open groups. Thereby, this theme is equally discussed in both types of online groups.

Verification in restricted access groups

In the absence of special mechanisms of verification built into the SNS mechanisms, administrators of some groups showed communicative ingenuity by writing private messages to new joining members asking them to specify the number of their apartment, the number of

rooms and the floor of the building, thus making verification with the means at hand. We got such responses from administrators of 18 restricted access groups.

An example of the message from the administrator of restricted access groups: *"Good day! This is an administrator of the group "X". To approve your response, I should know your flat number and the floor on which you live. If you don't send me this information, your response will be denied. Thanks for understanding!".*

Thereby, members of restricted access groups sufficiently decrease the chances of spam bots and "outsiders" gaining access to the group. Even if in some restricted access groups administrators do not use the same strict version of verification, they still often deny the requests, which seem suspicious or irrelevant for their community. We assume that this feature of restricted access groups is strongly connected with higher activity in these groups and allows residents to create stable communities of trust. The presence of trust in such communities is supported by the observation that in most restricted access groups people exchange their phone numbers and write about personal interests and problems.

Connection between local and city-wide communities

To check our suggestion about the structure of SNS which could allow different groups to form ties, we looked at the membership overlap between observed local groups of apartment buildings and groups representing city-wide initiatives. For this purpose, we chose the most popular and active city-wide movements existing on "VK". Our list of city-wide groups (Tab. 3) included various groups which principal purposes were focused on improving the urban environment of the city and fighting with problems which urban residents regularly face in everyday life as well as problems touching entire districts of St. Petersburg.

Fig. 5 shows the share of participants for each popular city-wide movement who are involved in local groups of apartment buildings. We can see that ties between open groups and city-wide movements are significantly stronger (Mdn = 5 % of overlapping participants) than ties between city-wide movements and restricted access communities (Mdn = 1 % of overlapping participants, W = 94, p-value < 0.01).

Tab. 3. City-wide activities

City-wide group	# of participants	Description
Against fill-in construction	359	City-wide activity against fill-in constructions on the territory of apartment buildings
Protect your home	200	Community of active urban residents who are not satisfied with the work of their management companies
Watching housing and utility sector	4082	The main purpose of the community is control for housing and utility sector and realization of citizen rights in this area
Leakages in St.Petersburg	2830	Community where urban residents can complain about leakages in their buildings and get help from the side of professional urban activists
Blue ribbon	3200	Community of urban residents fighting for preservation of historic buildings and territories of St. Petersburg
Urban projects in St. Petersburg	2694	Community focused on improving infrastructure of the city
Lively city	6053	One of the biggest communities opposing destruction of cultural monuments and fighting with constructions which violate rights of citizens
Network movement Free St. Petersburg	299	Movement supports the idea that citizens should manage the city by themselves
Beautiful St. Petersburg	46580	The biggest community fighting for improving urban environment
St. Petersburg for active citizens	870	Community of urban residents trying to set up the contact with authorities with the purpose to improve the city

According to Fig. 5, the stronger connections are formed between open groups and three city-wide initiatives which are concerned with local problems of apartment buildings in St. Petersburg ("Against fill-in construction", "Protect your home", "Watching housing and utility
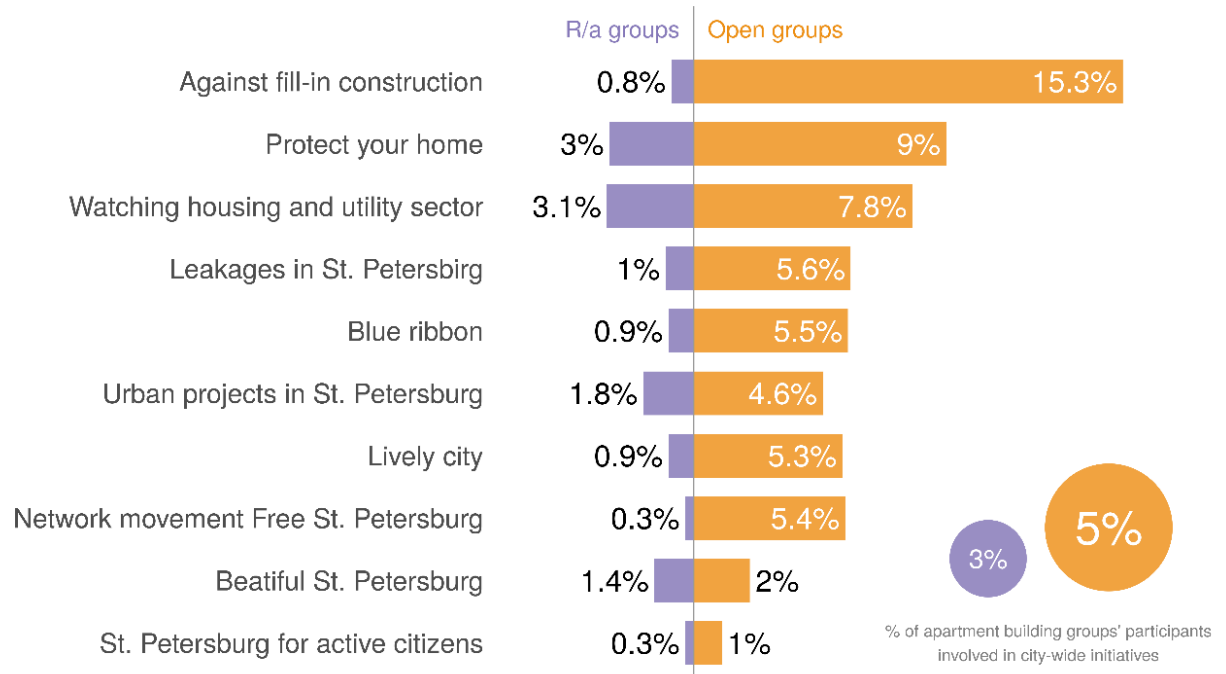

Fig.5.Involvement of participants of city-wide online communities in local groups of buildings

sector"). At the same time, ties with communities focused on improving the entire urban environment ("Beautiful St. Petersburg", "St. Petersburg for active citizens", "Urban projects in St. Petersburg") are much weaker. Thereby, we can see that the structure of SNS allows local communities and city-wide communities interact, and connections could be explained by common issues these communities try to solve, as in the case of Chinese homeowner forums (Huang & Sun, 2015).

DISCUSSION AND CONCLUSION

The main purpose of the current study was to analyze specific features of place-based communities formed on SNS and compare how patterns of communication in these groups differ depending on the mode of privacy.

Comparing private and public groups, we found that these groups are used by their members for different purposes. In restricted access groups, participants created communities based on mutual trust and help, excluding people not residing in their houses. Considering the prevalence of topics connected with the arrangement of new apartments and repair in restricted access groups and information about physical characteristics of buildings and age characteristics of users, we suppose that these groups are related to new-built large housing complexes and actively used by newcomers trying to simplify the process of moving and form ties with future neighbors. Thus, it is possible that online groups, in this case, were substitutes of offline communities which has not been formed yet, as in the case of Dublin (Daly et al., 2014).

In contrast, open groups are more often used by residents as public communication arenas to make public their existing problems and conflicts and even to strive for publicity. The price they pay for the openness is the number of spammers in these groups, which in turn leads to the decrease of activity among groups' members. Weaker activity in these groups could also be explained by the fact that most open groups had been created to solve problems, and these groups became superfluous after a certain conflict is resolved. Analysis of physical characteristics showed that these groups are rather related to older houses. Users live in these houses for a long time and are not interested in using online platform for socialization or helping each other with moving or repair. It seems that the main reason for forming such online groups is an appearance of the problem which can be solved only in a collective way.

Our study challenged the existing claim about the inefficiency of SNS as a platform for successful place-based communities' existence because of inability to provide enough privacy to users (Johnson & Halegoua, 2014; Masden et al., 2014). As our study shows, participants of

online groups could adapt the functionality of general purpose SNS to fit their specific needs. Such instruments as verification allowed administrators of communities to check if a newcomer is a real resident of a building or this account was created for spamming and advertising. Thereby, verification helped residents of the building create a community of trust where they could discuss private themes. And, at the same time, there is no need for closing a group if participants were interested in public discussions directed to solve their problems.

Analysis of connection between different communities showed that many of urban residents are also members of open groups of apartment buildings. Taking into account the results of related works (Gladarev & Lonkila, 2012; Huang & Sun, 2015), we assume that this connection between groups could be caused by common issues or similar goals these groups have. This feature of SNS VK put it in a vantage position in comparison with both urban online forums and place-based SNS, where people usually communicated in little groups relating to certain territories.

Analysis of co-membership also showed that SNS could be a good infrastructure for connecting communities relating to different territorial levels. In our case, we observed that local groups representing active residents of certain buildings were strongly connected with city-wide initiatives solving the same problems. Unfortunately, we had little information about the practices of interactions between these communities but, considering the study of Chinese homeowner forums (Huang & Sun, 2015), we were able to assume that such ties could help less experienced local communities get help from the side of professional activists managing online groups of city-wide movements.

Limitations

Our study has some limitations. Firstly, our analysis does not include those restricted access groups, which have a very strict process of verification of participants, and disallowed researchers to access them. It is possible that these communities have their specific features which distinguish them from groups with less strict access rules. Secondly, we have no information on the residence address of overlapping participants, and cannot identify whether they are active residents of apartment buildings involved in other initiative communities as in the study of Gladarev (2012), or they are urban activists residing in a different city area, but helping local initiatives. Thirdly, considering that open groups give access to all registered users, we can suppose that a part of overlapping participants can be fake accounts created for spamming.

Future work

In our further work, we have some topics which we would like to study in detail. Firstly, we plan to extend types of online communities collecting information about groups representing not only apartment buildings but also entire districts of the city. This will help us better understand how functions differ in communities relating to different territorial levels.

Secondly, we are going to conduct a detailed analysis of the available profiles of group members, especially the participants linking city-wide and local groups. Based on such analysis, we could reveal who are these people and study if they are professional activists or regular residents who were involved initially in local initiative and after that started participating in a wider range of civic activities.

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