



The digital power of the tower: digital communication technologies and dwelling experience in residential large urban developments

Ori Gershon-Coneal¹ · Efrat Eizenberg¹ · Yosef Jabareen¹ 

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Abstract

Residential large urban developments are the dominant mode of housing development in many cities around the world. They introduce new technologies to the residential setting that reshape the dwelling experience. Using digital ethnography and in-depth interviews with residents of three residential large urban developments at the center of Israel, this paper portrays how the digital dimension is embedded in and reshapes the performance and experience of the housing environment. We argue the centrality of the digital dimension to the emergence of a distinctly different dwelling experience and the transformation of residential power relations in the city.

Keywords Large urban developments · Residential · Digital · Technology · Power

1 Introduction

Large urban developments (LUDs) are widely investigated as a significant global urban transition, changing the way cities function, their volume and skyline, and are experienced (Drozdz et al., 2018; Eizenberg, 2019; Nethercote, 2018). Residential LUDs, in particular, present a distinct housing form with specific social, demographical, cultural, economic, and structural characteristics. They encompass several high-rise buildings (medium to high density), privately developed (usually by one development company), and various amenities and shared spaces for residents. Shared spaces include parking lots, open green spaces, playgrounds, the building's lobby, and more. Contemporary residential LUDs are inhabited mainly by middle to upper-middle-class populations (either renters or homeowners) (Baxter, 2017; Eizenberg et al., 2019; Harker, 2014). Due to their height, volume, and layout, residential LUDs depend on complex infrastructure and advanced technological means to optimize the building operation. Such systems include the building control and monitoring

✉ Yosef Jabareen
jabareen@technion.ac.il

¹ Technion Israel Institute of Technology, Haifa, Israel

systems, software for management of the building's maintenance, and software to charge a payment for all the work are usually combined with social media platforms to structurally and socially manage, maintain, and control this intricate housing environment (Garfunkel, 2017; Shilon & Eizenberg, 2021). Therefore, residential LUDs are progressively mediated and experienced through digital devices (Ash et al., 2018) that offer users a different set of abilities but raise different challenges for living, controlling, and managing collectively their spatial surroundings.

The relationship between information communication technologies (ICT) and urban space is extensively researched (e.g., Hampton et al., 2011; Schroeder, 2018; Sutko & De Souza e Silva, 2010). However, although studies recognize the important role that ICTs play in forming social connections, they mainly focus on the planning process (Afzalan & Evans-Cowley, 2015) and surveillance (Graham & Wood, 2017; Koskela, 2000). Consequently, the extent to which ICTs shape the physical and social residential environments requires research attention.

Therefore, this research investigates the dwelling experience in the vertical residential environment through two main dimensions: first, the **physical** dimension of direct engagement of residents with the vertical residential complex's shared spaces,¹ and second, the **digital** dimension, as manifested in social media groups of the residential vertical housing environment (WhatsApp and Facebook groups). By doing so, we portray the unique role of ICTs in the production of the residential LUDs dwelling experience, and in mediating between residents-neighbors and their shared environment and the city at large.

Recent calls to produce more qualitative accounts in evaluating the experience of residents in high-rise buildings (Brown, 2016; Harris, 2015) necessitate a bottom-up approach that allows for a complex understanding of the social, spatial, and digital dimensions. Additionally, the digital dimension acts as the lens through which we unpack current urban processes, analyzing how digital communication intervenes and reconfigures the current vertical-technological city, constructing new residential roles, new spatial practices, neighborly relations, and the relations between the housing environment and the municipality. We argue that the intersection between the physical and digital dimensions of the vertical living environment produces a distinct dwelling experience distinguished from other forms of living arrangements.

This article begins with a critical review of the literature on the current dwelling experience in the vertical technological city. It discusses the role of the digital dimension with a focus on social media platforms and the residential environment. After presenting the case study and the methodology, the analysis section is presented through three main themes: (1) Digital dwelling: immediate, intensive, and compulsory; (2) Digital overflow; (3) Management and control of the residential LUDs. The conclusion offers new understandings regarding the digital dimension and the wider urban context, considering residential LUDs' significant role in it.

¹ Shared spaces of residential LUDs are collectively owned and used by residents. They include indoor spaces (such as hallways, elevators, lobby, tenants clubs, gym, and playrooms) that are accessible to residents (and their guests), and outdoor spaces (such as gardens, and playgrounds) that might be accessible to the public but are not defined as public spaces.

1.1 Dwelling experience in the vertical technological city

Cities in the 21st century are climbing upwards at an unprecedented pace as their skylines are getting taller and denser than ever before (Harris, 2015; Nethercote, 2018). Recently urban studies addressed the vertical social qualities of current urbanism, embracing the vertical perspective to understand the urban socio-spatial relations (Baxter, 2017; Graham, 2015; Harker, 2014; Harris, 2015; Nethercote & Horne, 2016). They examine the experience of dwellers focusing on their feelings, practices, and daily use of the vertical environment (Baxter, 2017; Harris, 2015; Nethercote & Horne, 2016). Harris (2015) suggests understanding the vertical space in three ethnographic dimensions: how people experience, interpret, and engage with verticality. Baxter (2017) focuses on domestic vertical practices of residents in high-rise buildings (such as using stairways and lifts, the view-looking from the high-rise apartment, using outdoor space, etc.) as a “product of everyday activity” (p.338). He asserts that verticality functions in two parallel levels: as the outcome of peoples’ actions and in reconstructing peoples’ daily lives (Baxter, 2017). Mechlenborg (2022) argues that research on vertical neighborhoods should prioritize individuals and their social perception of home, highlighting the interconnectedness of home, culture, and shared spaces. Mechlenborg’s study emphasizes the necessity and purpose of shared semi-public spaces, support facilities, and social spaces first horizontally and only then vertically. Dwellers’ experience of verticality Mechlenborg (2022) suggests “starts horizontally at the front door, outside one’s home” (p.339) and only then expends vertically. Although studies of recent years significantly advanced the understanding of vertical urbanism, there is a need to further develop the knowledge regarding vertical socio-spatial practice (Ashery, 2019; Baxter, 2017; Harris, 2015). This need is more pressing in the case of the new residential LUDs middle-class families that are in sharp growth worldwide (Karsten, 2022; Ornstein et al., 2011).

Alongside the sharp growth of residential LUDs, the urban environment is undergoing another significant and profound transformation marked by the extensive integration of information communication technologies ICT into every aspect of urban life (Ash et al., 2018; Certomà, 2020; Chayko, 2020; Schroeder, 2018; Sutko & De Souza e Silva, 2010). As urban spaces are increasingly mediated through digital technologies (Ash et al., 2018), ICTs are changing the “social production of space and the spatial production of society” (Sutko & De Souza e Silva, 2010, p. 812), producing new forms of sociability and as such, we would like to show in this paper, reshaping dwellers’ spatial experience.

1.2 The urban environment and technologies

The perception of the Internet as a new space that creates social seclusion is gradually transitioning to a space that can preserve traditional community structures by connecting people to their local communities (Hampton, 2016; Miller et al., 2016). Studies demonstrate that technology usage among a vast population generates “a hypersocial society, not a society of isolation” (Castells & Cardoso, 2006. p11). Scholars assert that ICT connects people to the global community and their local communities (Hampton, 2016). Furthermore, scholars recognize local communities’ ability to claim virtual spaces, shaping them according to their local cultural and social needs (Miller et al., 2016). Miller and colleagues (2016), for example, demonstrate how different cultures consume media and shape social networks according to their needs and by doing so produce or reconstruct them. They show a resurgence of

collectivism and community in everyday life with traditional structures of extended families and community ties being transferred into the digital realm through social media.

Technology enables social interactions to transcend time and space limitations as they are mediated and synchronized through communication devices (Ash et al., 2018; Schroeder, 2018). Digital communication devices, such as smartphones, offer users a different set of abilities in controlling and managing their social interaction, enabling a more accessible and intensive form of ‘always on’ social life (Schroeder, 2018, p. 85), as people can communicate with each other according to their terms (Chayko, 2019). The insurgence of digital communication in every aspect of everyday life also unfolds challenges. Public and private realms are redefined through social media platforms requiring people to navigate through different layers of publicness and multiple social arrangements, coping with the “visibility and obscurity of their mediated acts” (Byam & Boyd, 2012, p.322). In addition, the expanding use of digital platforms also intensifies digital/technological inequality and increases the ‘digital divide’ between the privileged and underprivileged communities (Certomà, 2020).

Urban scholars also challenge the perception of social media as a distinct and isolated realm within the urban environment (e.g., Chayko, 2020; Gibbons, 2020; Hampton, 2016; Pink, 2016; Shilon & Eizenberg, 2021; Witten et al., 2021). Instead, studies call for an understanding of social media as an integral and dynamic urban space that encompasses elements of both online and offline domains simultaneously, thereby transcending the traditional dichotomy between the real and virtual realms (Horst, 2012; Moore & Rodgers, 2020; Schroeder, 2018). Digital communication over the neighborhood Facebook page is led by local physical concerns, events, and social organizations (Witten et al., 2021). Social media posts include real-time reporting (ibid.), meaning people post information about local events while they are occurring. Communication in these groups is based on members’ posts containing additional information besides the text. They are often accompanied by documentation – photographs, videos, tags, hashtags, location, and internet links (Moore & Rodgers, 2020).

Examining the local social role of neighborhood social media groups (SMGs) (i.e., Facebook and WhatsApp), scholars suggest that social media has emerged as a new platform for residents to actively participate in local neighborhood matters and engage in community activities. In turn, digital activity is perceived as strengthening physical and social interactions, fostering a sense of belonging, solidarity, and community (e.g., Gibbons, 2020; Shilon & Eizenberg, 2021; Witten et al., 2021). Studies suggest that people use social media to strengthen their face-to-face relationships by an exchange of information with each other, forming and reinforcing their social ties (Chayko, 2019; Schroeder, 2018; Witten et al., 2021). Studies show that it becomes common to interact both digitally and physically simultaneously with the same person, as socializing online creates emotional solidarity, increases opportunities for social connections (maintains existing relations and allows new relationships to be established), and eventually supports a sense of community and place attachment (Chayko, 2019; Schroeder, 2018; Witten et al., 2021). Gibbon’s (2021) study reveals a positive association between social media engagement and neighborhood community attachment, suggesting that social media can serve as an alternative means to encourage and maintain community ties in neighborhoods. Hampton et al. (2011) study on low-rise suburban communities found that online activities reinforce participation in traditional local settings. This observation led them to conclude that the “pervasive awareness afforded by

new technologies has more in common with a traditional village-like community than with individualized person-to-to contact” (p. 1046).

1.3 ICTs and residential LUDs

Research on the experience of vertical living reveals that digital communication channels, such as WhatsApp, can facilitate the formation of close relationships among individuals despite the absence of face-to-face interactions. Furthermore, ICTs have created new possibilities for engagement between people and space, which shape individuals' experiences of space and facilitate the dissemination of local knowledge within a community (Shilon & Eizenberg, 2021). Similarly, Witten et al.'s (2021), study on the interplay between online and offline interactions between residents in affordable housing development in New Zealand, explored the immediacy of neighborhood's digital communication and their ability to develop a place-based identity in a newly built environment. They suggest that community Facebook groups allow 'online neighborliness' (p. 8), often leading to face-to-face interactions. They argue that although social media has a negative side, for example, turning into complaints that could be sorted easily through face-to-face communication, social media neighborhood groups are mostly perceived positively by residents.

Studies also investigate the relations between social media, local neighborhood groups, and planning processes. Scholars assert that using digital technology for social interaction gives LUDs residents the agency to shape and design their housing environment (e.g., Afzalan & Evans-Cowley, 2015; Shilon & Eizenberg, 2021). For example, Shilon and Eizenberg (2021) found that digital communication provides residents with the opportunity for collective effort, empowering residents and evoking a sense of solidarity and community.

The practice of civil surveillance through local SMGs also receives much scholarly attention. Studies suggest that social media group serves as surveillance and enforcement mechanisms for local rules and behaviors (e.g., Arviv & Eizenberg, 2021; Witten et al., 2021). Surveillance emerges as a significant topic of discussion in neighborhood Facebook groups, as these platforms enable residents to effortlessly report “suspicious” behavior. Witten et al. (2021) suggest that digital reports on crime incidents in SMGs often lead to the organization and establishment of local surveillance activities and responses, such as a neighborhood watch. Their study conducted in a newly established housing project in New Zealand found that the vest exposure to incidents of crime facilitated by social media surveillance can undermine residents' sense of security. However, over time residents adapted their social media practices and exhibited a reduced level of alarm in response to crime-related posts (ibid.).

In this paper, we argue that the digital dimension profoundly transforms the emerging dwelling experience in residential LUDs, and therefore becomes inseparable from understanding the housing environment. We portray the socio-spatial roles of the digital dimension within residential LUDs and characterize the ways it reshapes almost every aspect of residents' daily experience. By exploring the digital dimension, we suggest that the influence of LUDs transcends their physical boundaries, empowering the residential LUDs internally and simultaneously disconnecting them from the wider urban fabric.



Fig. 1 The research site. *Source* The researcher in 2021

2 Methodology

In the last two decades, Israel has witnessed a vertical expansion with a dramatic increase in high-rise residential buildings (Mualam, 2018). As of 2022, residential LUD accounted for over 55% of all new housing units in Israel's major cities (cities with a population of more than 200 K). In some of these cities, the number soared to over 90% of new units.² Contemporary residential LUDs are mostly populated by middle and upper-middle-class groups, built mainly on the outskirts of cities or as part of new towns, characterized by homogeneous, mono-functional, high-rise buildings, and usually built around a semi-public open space (Eizenberg et al., 2019; Rosen & Razin, 2009; Tzfadia, 2005). Although high-rise residential developments are increasingly dominating the Israeli urban landscape, studies addressing the dwelling experience of high-rise residents in Israel are limited. Following a recent surge of interest in social aspects of dwelling in residential LUDs in Israel, this research examines three residential large urban developments, comprising 20 buildings of 12–24 stories, built around a semi-public open space, constructed from 2005 to 2013, and located in two relatively new neighborhoods in the city of Petah Tikva, Israel (See Figs. 1 and 2). Housing units in residential LUDs in Petah Tikva were more than half of the total new housing units in 2022.³

To examine the unique role of ICTs in the production of the residential LUDs community, and in mediating between residents-neighbors and their shared environment, this paper applies a qualitative research approach combining digital ethnography that helps investigate

² Israel Statistical Borough 2022.

³ Israel Statistical Borough 2022.

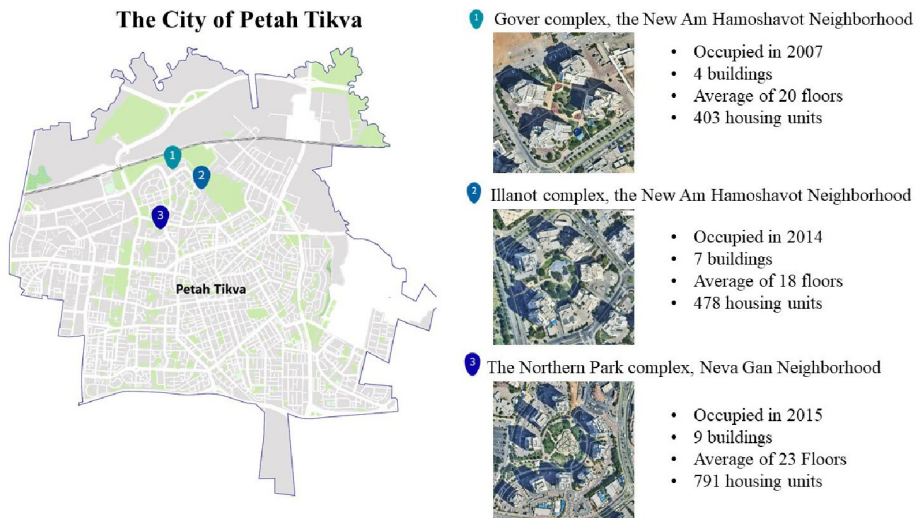


Fig. 2 Residential LUDs: The case study

the digital dimension in the everyday life of residents with traditional ethnographic tools (i.e., interviews and observations). Pink and others (2016) suggest that digital ethnography unravels “how invisible sensory and affective experiences can be made visible through focusing on routines and activities of everyday life” (ibid., p.24). With this understanding, we ask to integrate the digital realm and its interconnectedness with LUD’s residents’ everyday lives and social worlds. This research combines digital ethnography with traditional ethnographic tools (i.e., interviews and observations) to achieve a comprehensive understanding of the emerging dwelling experience in the residential LUDs; each tool represents a complex and multifaceted reality.

Empirical data was collected through observations on the direct engagement of residents with the residential spaces at different times in all three cases’ semi-public spaces. Content gathered from four different Facebook groups of the residential complexes was thematically analyzed. Twenty-three in-depth interviews with residents from the three residential LUDs were conducted in 2021. Interviews were initially recruited through ads in the local Facebook groups and then through snowball sampling to solicit other participants based on personal acquaintances of neighbors rather than from SMGs. Interviewees included 9 men and 14 women, when the average age range is between ages 30–45. They were from different buildings in the 3 complexes, from different floor heights, and different tenancy types. In addition, all interviewees participated in the housing environment SMGs to some extent.

Interviews were conducted, both in situ and virtually (via Zoom), in two main methods: sit-down interviews (19) and go-along interviews (4). Each interview lasted approximately 90 min and followed a semi-structured protocol that solicited residents’ overall dwelling experience, after which participants were asked to elaborate on specific aspects of their experience. Through this open dialogue we made sure that informants address their neighborly relations in various residential scales (i.e., the floor, building, complex, and neighborhood) and their use and perception of social media as part of their experience. Interviews were recorded, transcribed, and thematically analyzed using ATLAS.ti22 software for an

analysis and coding process. The analysis yielded a hierarchy of codes, sub-themes, and themes, as presented in Table 1. An open coding process was conducted at first whereby a substantial number of codes were identified and assigned to different text segments based on their meanings and central ideas. The codes were then re-organized into codes groups, reducing the codes to $N=98$. Subsequently, these codes groups were further organized into 12 sub-themes and six central themes, identifying and mapping hierarchies and relationships among the various themes. Research findings generate nuanced insights on the experiences and perceptions of individuals and their interactions with their physical, social and digital housing environment (Eizenberg & Shilon, 2016) rather than proposing statistically representative results.

This article elaborates on three of the central themes: #4) Digital dwelling; #5) Digital overload and its management; and #6) Management and control of residential LUDs, each includes sub-themes. Smaller social media groups (such as building Facebook and WhatsApp groups) were mentioned during interviews and referred to in the findings section but were not exposed to the researcher for ethical considerations.

2.1 Digital dwelling: immediate, intensive, and compulsory

Communication between dwellers in the vertical residential environment occurs mainly digitally via SMGs. A correspondence that takes a significant role in every aspect of dweller's daily lives. Through the various social media platforms (the neighborhood, complex, and building often have several groups in multiple digital platforms), dwellers manage their everyday routines, receive information on their immediate housing environment, and interact with fellow dwellers.

Residents often mention the immediate and fast-paced nature of the correspondents: "*It's like immediately, immediately people answer, straight away*" (N.A., 14th floor). Dwellers find social media as their 'go-to' place to get live updates regarding the housing environment: "*If suddenly there is a power outage, and you want to know what is going on, so you write there, many times people are doing karaoke at night and it's really noisy, so we write*" (C., 7th floor). Events in the physical space, such as infrastructure and maintenance-related issues (e.g., malfunction in the elevators or parking lots' gates), emergency cases (e.g., sirens), or extreme noise, are immediately reported digitally, often accompanied by

Table 1 Thematic analyzing process

Theme	Sub-theme	Code count
Theme 1-The structure of residential LUDs	<i>Sub-theme 1.1 - Levels of familiarity</i> <i>Sub-theme 1.2 - Between crowdedness and opportunity</i>	18
Theme 2-Neighbourly practice	<i>Sub-theme 2.1 - Mutual aid</i> <i>Sub-theme 2.2 - Neighborly conflicts</i>	15
Theme 3 - Positions	<i>Sub-theme 3.1 - Community positions</i> <i>Sub-theme 3.2 - Formal positions</i>	13
Theme 4 - Digital dwelling	<i>sub-theme 4.1 - Immediate, intensive, and compulsory</i>	17
Theme 5 - Digital overload	<i>sub-theme 5.1 - coping strategies</i>	12
Theme 6 - Management and control of the residential LUDs	<i>Sub-theme 6.1 - Civil surveillance</i> <i>Sub-theme 6.2 - Digital platforms as an arena for decision-making</i> <i>Sub-theme 6.3 - The Digital political power of the tower</i>	23
<i>Total</i>		98

visual evidence (a picture or video). This type of correspondence is evident on all social media platforms. While WhatsApp is usually used for inner-building issues, Facebook posts on neighborhood groups are usually related to issues concerning the complex or the cluster of complexes, such as emergency cases, extreme sounds, or juvenile misconducts.

Dwellers often experience the immediacy and fast-paced character of message exchange in social media as intensive: *“Everything is on WhatsApp; WhatsApp is active from dawn to dusk”* (D., 13th floor). Instead of checking the root cause of their disturbance, residents often complain about it publicly in SMGs: as A. (10th floor) puts it: *“Straight away with complaints and criticism, it’s all the time, ‘who is running in apartment X, 15th floor, stop running, stop smoking, who is doing a BBQ and did not announce it [in the group], I am about to turn on the BBQ’, dozens [of messages], all the time”*.

Dwellers often mention that this intensive digital communication interferes with and destructs their daily routine. C. (7th floor): *“So, I try to reduce my exposure time, I try not to allow it into my world. It is harder with WhatsApp, with Facebook I rarely log in. With WhatsApp you have no choice because it’s on your phone, and you see the messages, and you hear the beeps, so I must constantly look. Suddenly I realize I’m on WhatsApp for an hour, but I get sucked into it”*. Like C., other residents also experience a dependency on SMGs for staying updated on important and everyday occurrences in the residential environment: *“If, God forbid, your phone is suddenly dead, you have no way to get this information and it’s a problem”* (M.A., 5th floor).

Overwhelmed by the intensive digital flow of information, some dwellers report on attempts to leave different SMGs. However, their attempts failed. They quickly realized they were missing crucial information regarding everyday lives in the building. For example, A. (10th floor) reports that after leaving the group, she missed out on an important board message on the clearance of the shared storage space, eventually leading to her son’s bicycle being thrown away. After this incident, she reluctantly returned to the building’s WhatsApp group. Hence, being a part of digital communication is *“the only way to communicate and get updates”* (Q., 6th floor).

2.2 Digital overload and its management

Digital communication often evokes both bodily and psychological sensations among LUDs residents (Shilon & Eizenberg, 2021), akin to feelings of noise or crowdedness. For example, D. (13th floor) associates the feeling of crowdedness exclusively to the social media groups: *“Overall, as far as I am concerned, I live in a small bubble, I do not feel I have 86 tenants in the building until I enter the WhatsApp [group], there I feel it”*. Dwellers also describe the social media group’s correspondence as noisy: *“There is a lot of a lot of noise, a lot of commotion, writing all the time”* (Q., 6th floor). Furthermore, residents find it difficult to manage the constant influx of information they receive through digital platforms. T.Z. (1st floor), for instance, states that he is overloaded with unnecessary information by the digital correspondence: *“I felt all this information that comes from both the building group and the neighborhood groups, is too much for me, it feels like I’m under attack”*. In addition, *“there are all kinds of rules in these groups, and you have to know more or less the rules. It is not allowed to write everything everywhere. There are all sorts of rules in these groups. You pretty much need to know the rules”* (M.A. 5th floor). Thus, although these digital platforms can be perceived as a universal practice (the same interface worldwide),

they require a lot of local knowledge introduced to the dwelling experience by ICTs. The socio-spatial structure of residential LUDs entails an extensive reliance on ICTs making this new realm an integral part of vertical living.

We suggest understanding the experience of being overwhelmed by and at the same time dependent on intensive digital communication as a digital overload. To manage the digital overload, residents developed various coping strategies combining socio-spatial-digital considerations and practices. Some strategies relate to the ability to sort of and navigate between the different digital platforms by their levels of urgency and proximity. R. (19th floor) describes the differences: *“WhatsApp is strictly for your everyday issues – things that are directly connected to your life in the building, Facebook is [for] messages that you want more people to see”*. WhatsApp is experienced as personal, daily, more urgent and necessary, requires more attention, and evokes a certain level of FOMO. In contrast, Facebook is experienced as more general and wider, concerning larger spatial units like the complex, neighborhood, and city, discussing less urgent and more informative issues.

A variety of practices are applied to cope with the digital overload such as muting, filtering, blocking, and finally, exiting unwanted group chats. Although these practices help reducing the sense of digital overload, they entail a significant social price, the risk of missing out on important information and leaving dwellers without daily updates on their housing environment. For example, T.Z. (1st floor) states that he tried to leave SMGs but realized it *“created a big disconnection, I didn’t know what was going on because there is no other way to get informed”*.

2.3 Management and control of the residential LUDs

Somewhat unique to residential LUDs is an array of technologies embedded in their structure and inscribe their operation, social-spatial relations in them and in the environment in which they are located (e.g., Garfunkel, 2017; Shilon & Eizenberg, 2021). The usage of digital communication technologies in urban spaces, increasingly mediated and experienced through digital devices (Ash et al., 2018), offers users different control and management capacities over their spatial surroundings. Two main digital management practices are identified in residential LUDs: decision-making via digital platforms and civil surveillance.

Management of residential LUDs relies on different applications. Dwellers use an application to communicate with the buildings’ management company. In addition, digital platforms are used to control and manage the building’s shared spaces; dwellers register digitally to book shared rooms for private events: *“We have a tenants club in our building, which is a quite spacious room and is open to everyone. We register with him (a board member) and we announce in the group about a private event on a specific date and time”* (S.H., 9th floor). Usually managed by the board of residents, SMGs are also a decision-making tool. Decisions in the digital platform are both spatial, regarding the physical housing environment, and digital, regarding the digital platform itself. The immediately accessible digital platforms that are used by hundreds of residents sharing the same physical environment, enable the involvement of numerous participants in decision-making and managing the complex and intricate infrastructure systems. However, participants find the plurality of opinions challenging for the decision-making process: *“In twenty stories building, you have more opinions, and therefore here, many times, it is a place of conflicts”* (H., 5th floor). She

describes a balcony extension project that failed because the dwellers could not arrive at a decision regarding the project.

During COVID-19 lockdowns, digital platforms became even more significant since they were sometimes the only safe place for interaction. Residents' meetings were held virtually via Zoom during the pandemic. Z. (14th floor), a board member, mentions she was surprised by the exceptional turnout during the annual residents' meeting held on Zoom. After that, they consider conducting all residents' meetings on Zoom. Using digital platforms opens opportunities for attendance being unlimited by space. In addition to virtual meetings, spatial decision-making in digital platforms is usually carried out through surveys. During COVID-19, for instance, the board of residents distributed a digital survey via WhatsApp regarding opening or closing communal spaces, and daily infrastructures and maintenance issues.

Using digital platforms for communication among neighbors also requires deciding about the purpose, rules of conduct, and the roles of users. The group managers activated and enforced a certain code of digital conduct, deciding on the access terms (who is allowed in), participation terms (e.g., writing or viewing permissions), and eventually determining who gets to voice their opinion. But since getting involved digitally is easily available, residents also participate in shaping the character of the discussion. As D. (13th floor) explains, "[I] usually tend to intervene and comment so basic values in a group discussion will be maintained" (D., 13th floor).

Jacobs (1961, p. 36) suggested that "*There must be eyes upon the street, eyes belonging to those we might call the natural proprietors of the street*" to increase a sense of safety. However, the idea of "eyes upon the street" is not applicable from the 20th floor. It was replaced by new forms of surveillance that are highly criticized for violation of privacy, civil liberties, and potential abuse of power (Graham & Wood, 2017; Koskela, 2000). Surveillance is a prevalent practice in residential LUDs and is supported by social media platforms. One of the main ways for surveillance and behavioral enforcement in the residential LUDs is security cameras that are dispersed in the buildings' semi-public spaces. Footage from the security cameras is occasionally uploaded to Facebook groups with warnings of suspicious activities (e.g., littering, misuse, violent acts, juvenile misbehavior), singling out suspicious activity, or requesting identification of individuals who have committed wrongdoing (often tagging local police). For example, M.A. (5th floor) states that complaints about littering in the building's semi-public areas are frequently discussed on the WhatsApp group and are easy to resolve since "*today you can see everything on the cameras and know who did it*". A. (10th floor) mentions that in his building, residents frequently ask to add more cameras in the semi-public spaces for better control. However, the decision to publicly use the camera footage is in the hands of the board. T.O. (14th floor), a former board member, explains that the board is reluctant to expose security footage. If a dweller is caught on camera doing something, instead of publicly posting the footage, the board approaches the dweller or gives the apartment owner a warning letter.

Once the incident is documented and uploaded to social media platforms it becomes public, free for everyone to comment on it, or as Y. (9th floor) puts it: "*Life on NATO distribution*"⁴. Civil surveillance and enforcement are expended through the use of smartphones; group members become an active part of the building or complex's 'civil digital police' as well as witnesses to misdeeds (See Fig. 3). Y. (9th floor) describes an incident in

⁴ Referring to The North Atlantic Treaty Organization, suggesting a very wide distribution.

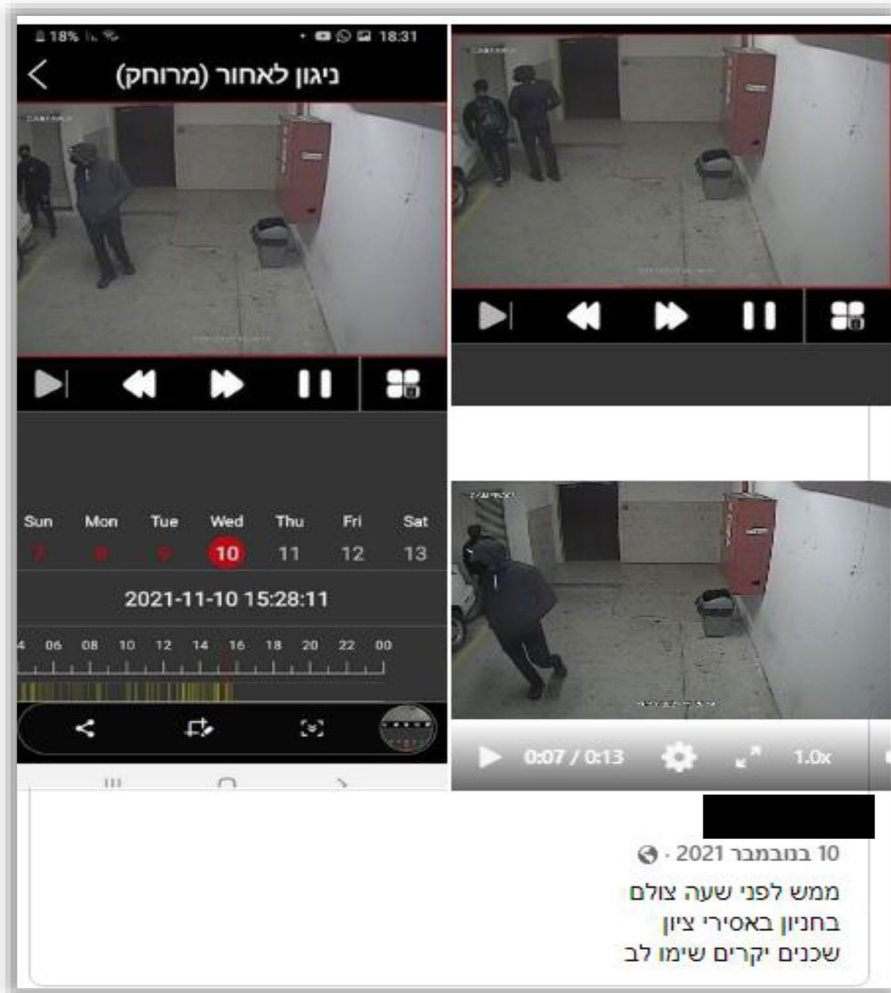


Fig. 3 Civil surveillance. *Source* The complex's facebook group
 Translation "Recorded exactly an hour ago in the Acirei Zion parking lot. Dear neighbors – pay attention"

which someone's dog defecated in the elevator, leading to a general request on the WhatsApp group to find the dog owners through security footage from the elevator: "We even asked for public shaming". The board of residents refused the request. However, on second thought, she declares: "There are things that we want to know, but knowing who it is can lead to a very unpleasant situation for the entire building, so I understand why they don't reveal". Furthermore, Y. mentions that public shaming is not common in their group. Rather than disclosing identifying details, they uploaded a picture of the nuisance (dirt in the elevator and such) and asked whoever was responsible to take care of it. However, this kind of respectful conduct is not true for all residential LUD groups.

During the COVID-19 outbreak and social and spatial restrictions, digital surveillance and public shaming were intensified, receiving 'additional legitimacy' because people

feared for their safety. A. (10th floor), for example, mentions she got a “*flood of comments*” after hosting friends in the building’s Gymboree (playroom) since it was uncustomary to hosting visitors during Covid-19 restrictions. She felt attacked by the comments of members on the WhatsApp group: “‘*Why did you let them in?*’ and ‘*they are not from the building, and they don’t live here*’”. In this case, the WhatsApp group served both for surveillance and enforcement, as residents publicly held A. responsible for breaking the building’s temporary ‘behavioral code’.

It seems that digital civil surveillance in residential LUDs is an internal bottom-up mechanism. This mechanism helps dwellers to keep the building ‘in shape’, clean and safe, contributing to a sense of security and a sense of control over the space. Although access to security cameras is restricted to the board, dwellers find ways to bypass this restriction by uploading their footage. This practice seems to encourage and help maintain an internal spatial and social order, enforcing LUDs’ spatial and social rules of conduct (see ‘HRC etiquette’ in Arviv & Eizenberg, 2020). Yet, controlling the space to this degree can be experienced by dwellers as limiting and restricting. N.O. (4th floor) explains the daily challenge of navigating the building’s rules of conduct, “*it feels like walking on eggshells*”.

2.4 The digital political power of the tower

The digital infrastructure of residential LUDs stretches beyond the building and the complex to the city at large, engaging with other urban stockholders and processes of spatial planning. The residential LUD is a densely populated, mostly privately self-managed urban segment. The new urbanism design of some of the residential LUDs makes them experienced as separated from the wider urban context: “*Everything we need is in walking distance. You don’t need to go outside of the neighborhood, everything is within our reach*” (B. 2nd floor). That is, the dense living environment and the structure of the physical environment offers its residents bountiful services and resources (e.g., convenience stores, health care services, recreational activities for children, and more) that make everyday life easier and almost eliminate the need to leave the cluster of complexes to obtain other services.

While the physical disconnection of the residential LUDs from the city is evident, the embedded technology, particularly the digital management of residential LUDs, enables the expansion of the information beyond the physical space. Residential LUDs dwellers and municipality representatives connect directly via SMGs (mainly through Facebook). T.Z. (1st floor) explains: “*There are three neighborhood [Facebook] groups, and each one belongs to a different political advocate*”. Hence, the neighborhood groups are managed by the municipality, its representatives, and their opponents. In these groups, residents tag the mayor in posts about various issues, from unusual events like witnessing a crime (hearing shooting or witnessing vandalism to public property) to more mundane issues such as extreme noise, fireworks, and environmental hazards. The mayor and municipal representatives also participate in these platforms, responding to residents’ posts by providing answers and apologizing or directing them to the specific authorities for helping with their complaints. They also assure residents that their complaints have been noted and actions are being taken to resolve them. For example, noise complaints about fireworks are common and often addressed by municipality representatives, who indicate that the police have been notified or are being sent to investigate the disturbance. In addition, issues of spatial planning process are also discussed via SMGs. These correspondences include complaints about

lack of maintenance and requests for more shade in semi-public and public areas, holding the municipality accountable for not developing commercial areas that are included in the development plans, or voicing their satisfaction with the municipality's recent public spaces renovation or lack thereof.

Besides using digital platforms to reply to residents' complaints and questions, Facebook neighborhood groups serve municipality representatives as an open stage to communicate their agendas and celebrate their achievements. For example, the mayor frequently posts updates announcing innovations happening in the neighborhood space, such as the opening of a new section of the park, the addition of a walking path, or the renovation of a playground (See Figs. 4 and 5). In addition, digital platforms were used during the pandemic to publish new spatial restrictions and regulations, informing residents of daily updates. Some residents used to respond to these posts with appreciation, while others express disapproval and complaints. As such, while these platforms serve municipal representatives for direct communication with their constituents, they also expose them to constant criticism, publicly voiced for everyone to see, and the risk of being held responsible for problems that are not necessarily under their control.

Digital communication between LUDs residents and municipal representatives reveals the distinct position of LUDs residents in the urban context. This position derives from the distinct, mostly isolated form and function of the new residential LUDs from the traditional urban neighborhoods, as privately self-managed extensive urban segments often contain many urban functions (open green spaces, religious and education institutes, and commercial uses, etc.), they have a well-established and highly active digital communication platforms for inner functions as well as for demanding and influencing the municipality. G. (17th floor), a social activist that volunteers with underprivileged communities in the city, witnesses the "special treatment," as he puts it, that residential LUDs population receives. He mentions, "The entire city's socio-economy index is based on these neighborhoods (the LUDs), the mayor here cares about the population of these neighborhoods, less for the other neighborhoods". G. explains that: "people there simply don't have, they don't have social services in the quantity that we have here, there is no health care center, here we have three

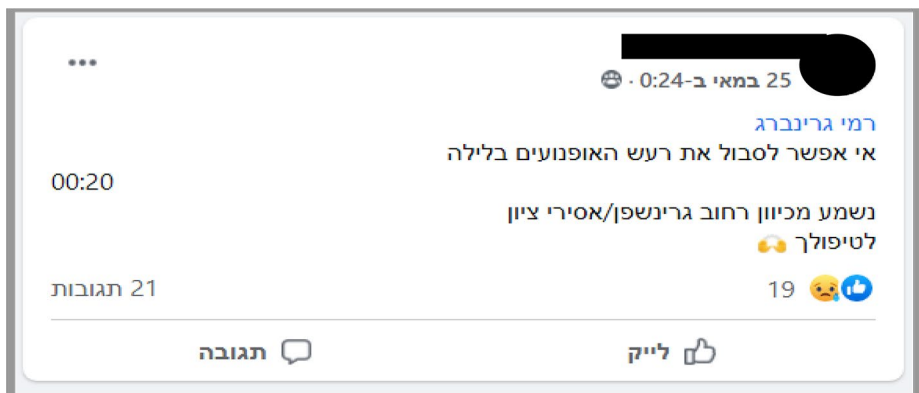


Fig. 4 Direct communication with the municipality through the complex's facebook group. Source: The complex's Facebook group
 Translation: "Remi Greenberg [The Mayor], *We can no longer stand the motorbikes' noise at night. The sound comes from Grinshpen/Acirei Zion St. For Your attention*"



Fig. 5 Mayor's response to the residents' complaints. Source LUD's the complex's Facebook group Translation: "Good morning, I would like to update you that due to increased distractions by youth during the night hours, I have instructed to upgrade security with five more teams that will join the municipal policing cars and motorbikes that are already patrolling during the night. All this is done to abolish this delinquency that harms the quality of life of residents. There will be no compromises on this issue. Always at your service. Remi Greenberg [The Mayor]"

centers in a 600-meter radius, other neighborhoods don't have it. We have different kinds of schools here, and there they don't. Parks like this don't exist in other places in the city, and there are many community services here". G.'s observation reveals not only a significant difference in the socio-economic status of residential LUDs' population to that of other neighborhoods in the city but also a prominent spatial gap.

3 Discussion and conclusions

This article portrays the role of ICTs in residential LUDs as constitutive to an immediate, intensive, and compulsory dwelling experience. This characterization unfolds new neighborly practices and, eventually, new forms of neighborly relations. Digital communication produces an 'always on' social life (Schroeder, 2018, p. 85), and transcends time and space limitations (Ash et al., 2018; Moore & Rodgers, 2020; Schroeder, 2018). We suggest that digital communication platforms allow residents to voice their opinion immediately, effortlessly, anytime, and from anywhere. This inherent accessibility of SMGs and their centrality in the ongoing experience of the residential environment generate both benefits and challenges for LUDs residents. Residents can actively participate in decision-making from a distance (all they need is their smartphones). The removal of time and space limitations, together with the extensive use of the digital platform as the main communication tool in residential LUDs, intensify the involvement of residents in, or at least their exposure to, the events occurring in their housing environment. Therefore, deficiencies and problems are less likely to go unnoticed. The implications of the entanglement of residential LUDs form and the digital dimension are especially important vis-à-vis studies that indicate no significant difference between housing form and neighborly relations (Hirvonen & Lilius, 2019).

However, 'always on' social life (Schroeder, 2018, p. 85) is often responsible for a *digital overload* wherein residents are exposed to issues that were hardly noticed in traditional

housing environments (specific maintenance issues, personal items, neighborly conflicts discussed publicly, etc.). In addition, SMGs' organized and somewhat strict structure is perceived as limiting involvement by some residents. Members of SMGs must follow the local and general (written or unwritten) code of conduct. A new realm of digital local knowledge is generated by dwellers, reshaping their experience and distinguishing it from other housing environments.

The new publicness that is formed by SMGs activity (Byam & Boyd, 2012; Schroeder, 2018) is particularly interesting in the case of residential LUDs because this form of publicness is attached to a particular urban segment towards which participants are emotionally attached and in which they are economically invested. The physical and digital characteristics of residential LUDs reveal also a tension between separation and connectedness of the residence and its urban context. The relatively isolated form and function of the residential LUDs produce a distinct model of self-organization, but with capacities to influence the municipality's conduct and a plethora of planning actions. We therefore suggest that LUDs residents obtain a centralized power within the urban context, which enables their spatially and socially concentrated urban needs to be influential and powerful in the wider urban context. The digital dimension of the residential LUD enables the expansion of the information outside the physical space of the residential environment, empowering its dwellers, and simultaneity separates it from the urban environment.

This twofold process that strengthens LUDs and simultaneously separates them also reshapes the local identities and definitions of LUDs residents. Scholars suggest that newly built neighborhoods, and residential LUDs in particular, often lack a strong sense of locality (Eizenberg et al., 2020; Talen, 2019). Eizenberg and others (2020) challenge the conventional notion of the neighborhood scale as the primary parameter to examine urban phenomena, proposing that people perceive their residential areas on a smaller scale than the neighborhood. However, we recognize a significant socio-spatial shift towards local identities and definitions within residential LUDs, largely driven by digital communication platforms. These platforms play a pivotal role in establishing and reinforcing the sense of locality, they expand the perceived scale in residential LUDs, connecting local spaces, buildings, complexes, and clusters of complexes. Moreover, SMGs reinforce the boundaries of the living environment, from the group's names (often indicating the name of the project's developer) and extend to complexes and neighborhood-based groups. This process leads to restoring the manufacturer settings, where SMGs reconstruct the statutory and planning definitions set by the developers.

Thus, we suggest understanding the new residential LUDs as nodes within the complex urban web. These nodes are relatively enclosed and disconnected from the traditional city, in both structure, layout, and internal organization. They are formed as distinctive urban social spaces (Jabareen & Eizenberg, 2021). In them, the role of the digital dimension is threefold: (1) it infuses people together through non-intimate but constant, immediate, and compulsory communication. (2) It plays a significant role in bringing to the surface, articulating and rearticulating dwelling-related problems and demands and making these issues constitutive of residents' dwelling experience. (3) Finally, the digital dimension enables the transference of information and influences the environment also outside the (limited) physical boundaries of the LUD through organized management and well-formed demands.

The result is relatively small in size but huge in the number of people urban segments – nodes – that operate differently in the city; they centralize relatively extensive political

power, being able to formulate and voice their demands, and be noticed by elected officials and planners. This phenomenon raises a new challenging planning issue regarding the construction of segregative urbanism; how to cope with and reintegrate the city segments.

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