



Transformations of Urban Space in the Digital Age: Towards a Digital Urban Sociology

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Abstract:

This article addresses the topic of transformations of urban space in the digital age: towards a digital urban sociology, through an analysis of the developments experienced by modern cities as a result of the significant and rapid transformations of digital technology. Thus, this article aims to understand how the urban inhabitant responds to these changes and their impact on reshaping the features of urban space as well as the social interactions within it. We have concluded that the current reality of cities and urban life calls for the development of urban sociological approaches to keep pace with the new data, relying on a hybrid approach that combines traditional and digital methodologies in order to understand the physical material reality along with the social reality in addition to digital changes. We also concluded that sociology must also keep pace with these changes by reconsidering classical concepts in accordance with the requirements of the digital transformation era, such as smart cities, digital urban services, digital citizenship, and the digital citizen. Furthermore, urban sociology has an important opportunity to exploit digital technology to develop advanced research tools for a deeper understanding of the relationship between the urban inhabitant and urban space in the digital transformation era, especially with the development of artificial intelligence applications and tools.

Keywords: digital age, digital urban sociology, space, urban ethnography.

I. INTRODUCTION

Throughout history, cities have undergone rapid developments, making them centers of knowledge, progress, and prosperity, which has always made them a space for attracting inhabitants and increasing urban life requirements. Cities today, thanks to the rapid development of digital technologies, have reached unprecedented radical transformations that have reshaped their material and symbolic spaces. This has been reflected in the nature of urban life, patterns of social interaction, and the reproduction of social ties. The city is no longer that physical built environment with which urban social life patterns interact, but is rather viewed from the perspective of the race towards the digital space, which has become an integral part of citizens' daily experience.

Faced with these radical changes, traditional concepts of urban sociology are called upon to rethink their analytical tools and central concepts in order to understand the new digital data in urban space and its repercussions on urban life, as well as the emergence of what is known as digital cities, which rely intensively on smart platforms in organizing and planning urban life.

Accordingly, the “digital city” today needs a digital sociological approach, capable of understanding and analyzing the complex interaction between physical space, digital space, and social space, as well as understanding the growing digital urban context and its impact on the reproduction of social interactions and the requirements of the digital age for the urban inhabitant.

Based on the above, this article revolves around the following questions:

1. How does digital transformation affect the reproduction of urban space, and how has this been reflected in the nature of urban social relations?
2. What is the appropriate approach for urban sociology to understand and analyze the process of these transformations?

First - Towards a Sociological Understanding of the Transformations of Urban Space in the Digital Age

1-The Concept of Digital Sociology:

The term “digital sociology” was first coined by the American social researcher Jonathan Wynn in 2009. He defined it as the environment that hosts social interactions

within digital reality and directs social behavior towards the age of speed and technology. (Hala Abdel Karim Abdel Ghani, Amer Shakir Khudair Al-Kinani, 2023, p. 190).

If we reflect on the definition, we can record the following observations:

a- The historical dimension of the concept:

The novelty of the term, which appeared in 2009, marking the beginning of the emergence of this field as an independent branch of social studies.

b- The social dimension:

The definition indicates that the field of digital sociology is concerned with “the environment that hosts social interactions.” This means that it is not a purely technical field, but rather an analysis of the emerging urban space where relationships and interactions among members of society arise and develop.

c- The digital dimension:

- Digital reality: meaning that the field in which social interactions occur has characteristics different from the field of traditional sociology, since the focus of study is the interactions that occur in urban spaces resulting from the growing use of digital technologies (such as the Internet, social media, and digital platforms).

d- The methodological dimension:

The phrase “directed towards social behavior” highlights the methodology of analysis and research for digital urban sociology, as it integrates the impact of the digital environment on the behavior of individuals and groups in urban space. It does not limit itself to the interactive aspect only, but also seeks to understand the digital mechanisms that direct the social behavior of the urban inhabitant.

e- The temporal-technological dimension (urban context):

The phrase “towards the age of speed and technology” refers to the temporal and societal framework, which requires analytical tools and concepts in line with the digital age in order to study the emerging urban reality.

As for the operational definition of digital urban sociology, we mean by it that field of scientific study of urban space through the attempt to understand how relationships and social ties are reproduced in their interaction with physical space, by exploiting digital tools and technologies such as big data, the internet, digital platforms, as well as the intensive use of digital means by urban inhabitants in obtaining various urban services. Thus, we say that urban sociology is a field of the emerging digital sociology that is concerned with studying emerging urban phenomena in a hybrid style, adopting traditional methodologies and at the same time exploiting digital methodologies to arrive at an understanding of the interaction occurring between physical reality and virtual reality.

2- Digital Urban Sociology and the Digital Society:

Before discussing digital sociology, it is appropriate to return briefly to the early beginnings of urban sociology and its view of the city. Although interest in the phenomenon of cities is an old phenomenon, the true scientific study of it was linked to the emergence of sociology itself.

Social thinkers up to the Industrial Revolution were concerned with viewing the city as the very core of society, not as a special or distinctive form of social life. This perspective remained dominant among those interested in talking or studying it, and thus the field of urban studies was not clearly defined until very recently. The discussion of urban phenomena reflected all dimensions of social reality. (El-Sayed Abdel Aati El-Sayed, 2013, p. 12).

What is certain is that the field of urban sociology is the city as a physical field on the one hand and a social field on the other, which is confirmed by Chambart de Lauwe, who sees that many researchers emphasize the dual dimension of the city, as it is at the same time a physical framework and a socio-cultural complex. (Mohamed Boumakhouf, 2001, p. 36).

Thus, on this basis, it can be affirmed that the city does not constitute a purely physical concept but is also a social and cultural subject. However, the difference came with

many urban sociologists who employed several variables to interpret the urban phenomenon, according to clear sociological concepts.

Discussing the early beginnings of theorization in urban sociology leads us to the Chicago School, which is considered the cradle of the scientific study of the city, taking Chicago as a social laboratory for a set of empirical studies within this space full of contradictions and social phenomena that the pens of the school's pioneers explored.

Robert Park is considered one of the most prominent founders of the school, who studied the city from three interacting aspects: the ecological aspect, social organization, and the psychological aspect.

Louis Wirth also stands out with his ecological view, as he defines the city as a relatively large urban unit characterized by population density and is a permanent residence for socially heterogeneous individuals. (Hanaa Mohamed El-Gohary, 2009, p. 48). Wirth's definition contains several variables for the field of scientific study of the city, centered between the physical urban aspect with its distinctive size and density, and the social and cultural particularity, ultimately producing a distinctive urban lifestyle that Louis Wirth called "urbanism as a way of life."

As for Burgess, he also adopts ecological concepts to interpret the factors controlling the social division of urban space, linking them to social reasons that individuals adopt in their urban groupings in order to preserve their cultural identity or to maintain social distance between different social groups economically and ethnically.

Georg Simmel also made a major contribution in the field of urban sociology, as he focused on the mental life of city inhabitants, which he explains by the heterogeneity of urban society in terms of size and density, considering them as givens for the psychological outcomes experienced by the urban inhabitant.

From the above, it is clear that sociologists in the field of urban studies were interested in the urban phenomenon from the perspective of mutual influence between what is physical and what is socio-cultural. Thus, this approach cannot be dispensed with in explaining the transformations and changes that the city undergoes as a social phenomenon.

3-Methodology in Traditional Urban Sociology:

Urban sociology, as a branch of sociology in general, derives its methodological foundations from it. Thus, the methods, tools, and techniques necessary for urban studies are the same as those used in the sociological analysis of social phenomena in general.

What matters to us is to know the specificity of urban phenomena and the appropriate methodologies for them in each historical period, so that we can later answer the question of whether traditional methodologies respond adequately or fall short in understanding the digital reality of modern cities.

The works of the Chicago School were characterized by their deep field methodological approach, as its pioneers focused on social research and statistics, as well as experimental methods such as objective observation of social reality and personal and official documents. (Mohamed Mahdan, 2013, p. 07).

Chicago was the social laboratory for researchers in the field of urban sociology, as Robert Park described it. This city was a destination for immigrants from all races and ethnicities, which led to its rapid growth physically and demographically, producing unprecedented urban growth in the city's history and sudden morphological changes, resulting in various social problems such as crime, neighborhood gangs, poor integration, and housing issues, among others. These problems attracted the attention of the early sociologists of the Chicago School.

Thus, the specificity of the city at that time gave scientists a push towards a break with traditional theoretical desk research, and they established a new path of empirical research in order to reach the social reality of urban life and the problems associated with it. Among the major contributions of the sociologists of this school was that they developed original methodologies: the scientific use of personal documents, direct fieldwork, and the exploitation of various documentary sources. (Abdelrahman Al-Malki, 2016, p. 63).

Leon Small expressed this by saying: “The city of Chicago is one of the most complete social laboratories in the world [...]. The most important problems for modern society appear clearly in large cities and must be studied as they really are in large population clusters, and there is no city in the world that offers us this enormous diversity of typical social problems like the city of Chicago.” (Abdelrahman Al-Malki, 2016, pp. 49–93).

Accordingly, we can distinguish a set of methodological characteristics in the traditional research of the Chicago School, the most important of which are:

1.The ethnographic approach in studying migration and urbanization phenomena:

This methodology is considered one of the most important innovations associated with the school, where scientists took the city as a field of research through which the behaviors and positioning of people could be directly observed.

This legacy continued for decades in the development of urban ethnography in America and Europe. However, this methodology was not only useful in studying the city but also in describing the adaptation processes of newcomers and how they were received by the host urban society.

2- Focus on Empirical Research:

The most important feature that distinguished the methodology of the pioneers of the school was their reliance on fieldwork and direct observation from within the city itself, in order to study the behavior of individuals, their interactions, and their social dynamics. This approach was revolutionary and contributed to the consolidation of sociology as an independent discipline concerned with the problems of urban reality.

(sociology.institute, 2022)

3-Reliance on the Technique of Participant Observation:

As we pointed out earlier, the most important methodological requirement for the pioneers of the school was the call to go down into the field, interact with people, use observation, and collect field data.

Ethnic differences constituted an important point in the early urban studies of the industrial city as a result of the large migrations these cities witnessed. This reality

made observation an important tool in monitoring cultural interactions with the new reality.

This method witnessed widespread use in various scientific fields, especially in sociology by the Chicago School, in psychosociology, clinical psychosociology, and others at the hands of quite a number of researchers such as Nels Anderson, Léon Festinger, and William Foote Whyte (Thabeti El-Habib, 2010, p.60).

4-Official and Unofficial Records and Documents:

Scholars relied on these documents because of their importance in understanding the behavior of migrants in host cities.

To understand how each migrant behaves according to the way he lives his situation at a particular moment, it is necessary to collect data and documents that will enable access to his inner self, such as his biography, his private letters, and so on (M'hamed Amhidan, 2013, p.08).

These techniques are linked to the study of individual cases in order to provide a subjective vision of individuals' experiences of integration into urban life. They varied between official documents (statistical data and population censuses, court and police records, social institution records, press articles) and unofficial documents (life stories, personal letters, and correspondences).

Second – Digital Urban Sociology:

Urban life is undergoing radical changes, as smart cities have emerged and become a hallmark of the age. These cities rely on software and code.

Software now permeates all aspects of daily life, creating a new and complex form of automated spatiality... This has important consequences for what we consider to be the tangible aspect of the world. Dodge and Kitchin express that code is the lifeblood of the network society, just as steam was at the beginning of the Industrial Age in history.

Code, like steam, has the power to shape the material world; it is capable of producing space (Burrows & Beer, 2021, p.85).

This new reality raises an important question about the place of urban sociology in keeping pace with the transformations of urban society towards the digital society, and the impact of software and codes in directing social relations in urban space. What are the tools and techniques capable of achieving this?

Software and codes in urban space have become part of our daily lives, for example smart urban spaces, smart surveillance systems with cameras connected to artificial intelligence in cities, smart traffic lights, and parallel digital spaces (Virtual & Augmented Spaces).

This includes the use of Google Maps, which provides digital guidance for individuals and institutions to places and streets, and addresses that make it easy for them to move smoothly to their desired destinations.

In addition to the various urban facilities provided by digital transformation, including virtual commercial transactions, administrative procedures, etc., the emerging urban space resulting from the integration of physical infrastructure with digital data and software now produces new encrypted spaces that redefine the concept of urban life.

In the face of these unprecedented transformations, researchers in the field of social sciences, according to Roger Burrows and David Beer (2021), are confronted with an inevitable necessity to reconsider traditional perspectives and visions of the city. The changes that urban space is undergoing also require an innovative urban sociological vision that takes into account, in addition to the physical aspect of the city and the social interactions that characterize urban life, also the structure of the digital space in its material and technical form. Thus, sociologists are obliged to understand and analyze codes and digital data in order to reinterpret individuals' social behavior, since understanding the digital, social, and material dimensions of urban space is essential to understanding contemporary transformations.

Third – Methodological Renewal in Urban Sociological Studies: Digital Ethnography as a Methodological Response to Contemporary Changes

The American scholar Saskia Sassen (2000) emphasizes the importance of renewing urban sociology's research methodology in light of the new data and changes that city is currently experiencing. She argues that the dominant forces reshaping the social, economic, political, and subjective at the end of the century are globalization and new information technologies. She acknowledges that these reflections are quite evident in the urban sphere and that they are phenomena unfamiliar to urban sociology. She adds that the traditional tools in

sociology help us understand some of these changes, but theory has not kept up with transformations.

In the same context, Saskia Sassen (2002) presents some obstacles that prevent reaching an interpretation of urban phenomena in line with modern technological data. She argues that the difficulty analysts face in determining or understanding the impact of digitization on cities is due to two analytical shortcomings: one relates to the purely technical reading of digital technologies' capabilities, which eliminates the idea of place and raises the idea of non-place; the second is the continued reliance on analytical classifications developed under spatial and historical conditions prior to the current digital era, thus hindering an understanding of the impact of digitization on the material conditions related to urban space.

With the beginning of the first decade of this century, new concepts began to be developed to domesticate methodologies and techniques in the context of forming a methodological framework specific to the virtual society. In this framework, Christine Hine's works emerge, through her adoption of the concept of virtual ethnography as a research method based on engagement within the virtual society and observing the various interactions and electronic activities that take place within it (Mahjouba Kaoukou, 2019, p.94).

Urban sociologists have relied on the ethnographic method in traditional studies as a key tool to understand the transformations of urban life throughout history. We believe that today's urban space needs this method in light of the profound technological transformations that cities are experiencing in this century. This method has not lost its importance; on the contrary, the need for it has become more urgent than ever, provided it is adapted to new variables. Hence, scholars today adopt the concept of digital ethnography to study urban cities, making it a powerful tool in studying virtual social interactions in a hybrid urban environment that combines both the material and the virtual.

This methodological renewal is considered necessary to reproduce concepts and theories in line with the new reality. If we reflect on contemporary urban academic discourse, we find it presents new concepts related to traditional concepts. The city, as a term, has always been a central subject in urban studies, but what is new are the concepts attached to the city, such as smart cities, virtual cities, smart transport, smart governance, smart urban society. All these concepts suggest a duality between traditional and new

concepts. This is sufficient evidence that we are not merely experiencing a transformation in the pattern of urban life but a transformation in our very understanding of the city itself. The attribute of “smart” accompanying traditional concepts in their renewed form implies the necessity of methodological renewal to understand the new dynamics reshaping urban space in our age.

Hammersley and Atkinson presented a basic definition that can be applied to most studies regarding what ethnography is:

“In its most distinctive form, it involves the ethnographer’s participation, overtly or covertly, in people’s daily lives for an extended period of time, watching what happens, listening to what is said, asking questions – in fact, collecting whatever data are available to shed light on the issues that are the focus of the research” (CHRISTINE HIN, 2000, p.40).

Thus, the essence of ethnography is the actual presence of the researcher and his active participation in the real life of members of society. However, the new data impose a reformulation of the method in a way that corresponds with changes, and this is what we find in the works of many contemporary ethnographers, such as the distinguished work carried out by Jeffrey Lane in his book *The Digital Street* (2019). This book represents a profound urban digital ethnographic study within the central Harlem neighborhood of New York City, presenting an analytical model that combines traditional field ethnography and digital ethnography.

According to Katherine L. Walters (2020), Lane’s work raises epistemological questions concerning the place and manner of knowledge production. Digital media, especially visual content, despite its importance and high credibility as a representation closer to reality, suffers from a fundamental methodological shortcoming in that it is stripped of context and time, excluding everything outside the frame of the camera or before or after filming, based on the conscious decision of the content producer. This means that the researcher who relies on such material is dealing with a guided reality, unlike field ethnographic observation, which is capable of understanding the general context of the urban scene (Katherine L. Walters, 2020, p.1082).

Lane provides an extremely important theoretical contribution to urban ethnography through the methodology of combining the digital street and the physical street. He

considered various digital media to be an inseparable part of youth life in Harlem. These two spaces, digital and physical, serve as a social medium shaped to regulate youth interactions. They are a source of building and formulating knowledge in integrated, not separate, ways. This integration provided new opportunities and horizons for youth, while at the same time posing dangers by contributing to the emergence of violence. This makes the addition of the digital dimension to urban ethnography an inevitable tool for deep analysis of urban phenomena, especially youth violence and delinquency, as well as a broader understanding of the future of generations living this dual presence between the digital and the physical worlds.

Accordingly, Christine Hine (2000, p.44) argues that this perspective provides an opportunity to analyze the importance of face-to-face interaction by looking at the role played by the ethnographer's presence in the field site over time. The centrality of direct encounters in ethnography can be understood if we reflect on the way in which ethnography has been produced, as a trustworthy text based on travel, experience, and interaction. This approach is particularly useful to avoid premature judgments about the sufficiency of various means of communication from an ethnographic perspective – an assumption that has proven problematic regarding computer-mediated communication.

As urban life moves toward the generalization of smart cities heavily dependent on data, algorithms, and codes, this provides researchers with great opportunities to collect quantitative data and analyze it in order to understand the city and its transformations. The researcher can obtain massive data, especially regarding the use of urban services, transportation problems, crime rates, etc. However, he cannot, in turn, explain the lived reality of the smart city dweller, nor can he explain the social anxiety surrounding privacy and personal data, nor the fate of social and direct relationships in light of the spread of urban services through digital technologies. Therefore, the actual presence of the researcher in the field is necessary alongside virtual presence.

From another perspective, studying urban space from the angle of digital services, from a sociological standpoint, requires focusing on the role of those tools and applications designed to serve the well-being of the urban resident. Methodologically, in digital ethnography, we can know whether these platforms and applications are used as tools to activate collective participation or as tools that increase social isolation and individualization. Digital urban sociology also raises, in the same context, questions about the extent of individuals' ability to use digital technologies to access urban

services, the level of satisfaction with these services, and whether all city residents can access these digital services without exclusion or exception.

The value of this method lies in formulating a methodological model based on a hybrid ethnography (material and virtual) that focuses on studying the reality of urban spaces in the digital age and answers contemporary questions about the consequences of reliance on digitization in urban life and its various effects on lifestyle, culture, and certainly privacy.

II. Conclusion:

In conclusion, we can provide clear answers to the questions posed at the beginning, which were the starting point of this article. Our goal was to reach an interpretation and analysis of the effect of digital transformation on the reproduction of urban space, and the resulting repercussions on the nature of social relations. Our main focus was on answering the methodological foundations appropriate to keep pace with this complex, ongoing, and renewable process.

The first part of our analysis proves that digital transformation has produced a hybrid urban space. In it, the form of social interaction between urban residents has changed, and with it, the actual presence of citizens in urban reality has shifted through:

- The reshaping of the social space of the city as a result of service facilities in smart cities, leading to a reduction in the extent of physical presence and its replacement with virtual presence.
- The entry of digital media into individuals' lives has diminished the importance of urban place and its symbolism for the urban resident, such that the actual place becomes merely a name we pass by casually, without forming a mental image of it.

This digital transformation has had repercussions on the nature of social relations, as the physical space has become less important compared to the digital space, which has begun to attract the attention of many groups. This contributes to reducing opportunities for face-to-face interaction, and also threatens social values and social bonds, while encouraging the expansion of the boundaries of individualism.

This digital transformation has led to a change in the concept of public urban space, as digital platforms and applications have come to play a central role parallel to and substituting for the real, physical space.

At the methodological level, urban sociology in the age of digitization is required to develop new tools to understand this process. Relying solely on classical methods (direct observation, field analysis) is no longer sufficient. It has become necessary to adopt a hybrid approach that combines traditional methods with modern digital methods, in order to approach an understanding of contemporary digital transformations and their impact on the reproduction of urban space.

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