DIGITAL PLACEMAKING: PERCEIVING MEANINGFUL SPACES THROUGH THE DIGITAL ENVIRONMENT

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ABSTRACT

In recent years digital technology has revolutionized almost every aspect of people's lives, impacting the reciprocal relationship between people and place. The practices of "digital data" or "digital environments" are undoubtedly increasing, affecting the sense of belonging, place attachment, and the whole community. Contemporary city planning so-called "smart cities" adopted interventions involving digital urban media or digital placemaking to encourage the interactions between individuals and public spaces. Although digital placemaking practices are still predominantly experimental, applications successfully created a sense of place, belonging, and place attachment. This research tackles digital placemaking practices by applying a comparative analysis, including six international case studies, to extract the main concepts supporting digital placemaking and achieved values. The results accentuate the reflection of digital data on transforming public spaces into more desirable places, and some suggestions are mentioned to upgrade public spaces in the New Administrative Capital, the first smart city in Egypt, to more interactive and creative venues.

KEYWORDS

Digital Placemaking, Digital environment, Smart Cities.

INTRODUCTION

In recent years, city planning has deviated from focusing on the rhetorical planning process towards radical interventions that target aspects particular to the local community, perceived values, and social coherence. More intention is drawn towards people's perceptions of the public space identity and usage patterns to increase the quality of life. Plenty of research analyzed extensively public spaces networks and their impact on the wellbeing of individuals inside the public spaces. While these studies figured out that public spaces are not physical elements for daily activities, they also impose stewardship of subjective meaning that is accentuated over time. Besides that, public spaces that can attract people to congregate and where friendships and social networks are shaped and defined are keys to the general sense of place (Dines et al., 2006).

Placemaking is the art of reinventing public spaces to strengthen the connection between people and maximize shared values (Sepe, 2015). It facilitates creative use patterns, focusing on physical, cultural, and social identities. Placemaking can generate positive attributes in the community, such as better social networks, interaction, sense of self-value, sense of belonging, democracy, sense of safety and comfort, education, cultural acceptance, and empowerment, in other words, a better quality of life. Placemaking history returns to Henri Lefebvre, who introduced the concept of the right to the city (Lefebvre, 1972), Jacobs and William, who introduced revolutionary ideas

about designing cities for people and creating vibrant social life in public spaces (Whyte, 1980). Nowadays, placemaking comprises four pillars, sociability, uses and activities, access and linkage, and comfort and image (Project for Public Spaces,2020).

In this decade, technology and globalization have penetrated and invaded the human lifestyle. Traditional cities are turning to smart cities, where trazxaditional networks and services are more efficient using digital solutions for the benefit of inhabitants and businesses. Our cities are becoming a flux of networks reflecting many values and meaning, transferring unlimited messages via means like newspapers, signboards, and urban digital screens (Mitchell, 2005). Inhabitants' perceptions of the city are determined by visual cues in the form of light, colors such as advertising, street and traffic data, and other simulations of people's movement (Lima, 2016). The growing digital urban data and ubiquitous technologies aided in the emergence of new design tools seeking to encourage community involvement and sharing thoughts with stakeholders, one of these tools is digital placemaking (Hespanhol et al. 2017).

Therefore, this research highlights main questions; 1) What is digital placemaking?; 2) How can digital data and communication assist the growing models of urban interventions of traditional placemaking?; 3) How to benefit from the novelty value related to many forms of human-computer activities in public spaces; 4) How to involve local communities in the shared design of the built environment that are meaningful, and simultaneously add value so as to assure long term stability of the design solutions?.

This research encompasses these questions by comparing existing case studies that applied digital placemaking from different regions. It addresses the design aspects that are shared in each case's efficacy. These aspects are driven by the physical characteristics of the built environment, the kind of digital activities inside the space. The synthesis of these factors is conducive, in essence, to the place's meaning among individuals. The analysis also ensures the functional role of digital media and communications in increasing the interactions among users in public space. It also sets the commonly used strategies for boosting and cultivating care for urban spaces through gathered data from the local community. It also defines emerging trends on approaching the mechanism of designing a responsive built environment with digital media that can be compiled into guidelines of co-design of places invigorated with meaning and value through digital placemaking and community participation.

1. DIGITAL PLACEMAKING

Digital placemaking is an evolving field of study and practice that addresses the use and impacts of digital technologies on placemaking practices (Toland et al.; 2020). Its term has emerged in line with the evolution of digital technologies and digital cultures in the last decade. In the beginning, its application was primarily used in the digital electronic and multimedia technologies which physically set up or projected in public places. These applications were known as "Media Architecture" (Haeusler et al., 2012; Haeusler et al., 2017). Progressively, the term is being used to describe potentials in which digital data could expand traditional placemaking practices, extend community involvement, or promote communication and cooperation among stakeholders (Aurigi & De Cindio, 2008; Fredericks et al., 2016). The term is also simultaneously related to the evolving field of urban interaction design, in other aspects, described as Urban IxD (urban interaction design) (Fredericks et al., 2016; Brynskov et al., 2014). Digital placemaking can be viewed as a part of extensive and swiftly emerging studies on the

physical, digital, social, environmental experiences stemming from the abundance of smartphones and social media platforms (Griffiths & Barbour, 2016; Kember& Zylinska, 2012; O'Neil, 2016). The term digital refers to applications or a set of practices, including digital or software technologies or communications, particularly the internet (Toland et al.; 2020). Although critic views are attacking the mutability of digital platforms practices (Toland et al.; 2020), the integration between technologies, social, cultural political, and creating places is a matter of life fact.

2. MECHANISM OF PERCEIVING SPATIAL QUALITIES

Understanding human relationships with space is based on how individuals become aware of it. The mechanism of visual sensations through perceptions of our environment results from an intricate interaction between intellectual functions and the eye (Lawson, 2001). Two-thirds of nerve fibers in the central neurological system are from the human eyes. Thus, humans used to inhabit a very visually controlled culture. It is logical to forget that the space is also perceived through senses of voice, tactile, and even olfactory. In fact, perception is mainly more than just sensation; it is a *Living* process through which we perceive the surroundings using all senses without conscious analysis (Lawson, 2001). The conscious analysis appears when evaluating the space. The extent to which these spaces fulfill human needs of feeling safe, comfortable, and pleasure create fulfillment or dissatisfaction. A set of criteria developed by Gehl promoting urban space livability suggests three widely desired aspects: protection, comfort, and pleasure (Hespanhol, 2018). Protection is providing shielding from probably hazardous factors in the city like motor vehicles, extravagant noise or fumes, electrical threats, criminal behavior, exposure to heavy sun and rain, etc. Comfort, includes elements that minimize effort in mobility through using the space, for example, a smooth and wide sidewalk for walking, convenient spaces for playing, and seating that encourage conversations and let people watch the space. The third livability aspect is pleasure or enjoyment, which refers to features that boost individual experience inside the public space, like aesthetic elements, cultural figures, and ease of mobility through the place. Table 1 illustrates the aspects above.

Table 1. Gehl institute quality criteria for public spaces

Protection	Against Traffic and accidents	Against harm by others	Against unpleasant sensory experience
Comfort	Options for movement	Options to wait and linger	Option for seating
	Option for watching	Options for talking and listening	Opportunities for play, exercise, and activities
Pleasure	Human scale	Positive aspects of climate	Aesthetic qualities and positive sensory experiences

Source: Hespanhol, 2018

Previous criteria offer an effective tool for designing urban spaces that can be enjoyable, welcoming, and meaningful through assuring they will provide, to a sufficient level, the basic needs of three previously mentioned aspects. A space can be considered meaningful to the community if it supports, for its users, purposeful contemplating or collaborative social integration, creates memories related to a specific place, and encourages repeated returns (Hespanhol, 2018). Meaningfulness can be achieved by providing places for interactions and retreats (Dines et al., 2006). Places for interaction may accommodate three broad aspects of social interaction; 1a) physical interaction like play areas, areas for physical exercise, and festivals; 1b) social participation such as places for discussion for civic matters and community involvement; and 1c) artistic articulation (Hespanhol et al., 2017). Concerning places of restoration, they may support self-analysis or meditation in public spaces commonly embodied as focused amusement such as reading, scrolling news on smartphones, rumination of the surroundings, and reflection. Moreover, restorative areas support engaged onlookers, passive contribution in social interaction by observing other individuals in the ambient environment. As shown in Table 2, the meaning application in public spaces includes interactions conducive to emotional attachment to a specific place.

Table 2. Meaning application in public space

Purpose of public space	Types of engagement	Examples of activities
Interaction	Physical interaction	Play games- exercise- festivals
	Civic engagement	Civic debates- Community participation
	Artistic articulation	Display of collective mood visualization
Retreat/ Restoration	Introspection	Leisure- contemplation – Engaged Spectatorship

Source: Dines et al., 2006.

A study by Montgomery (1988) suggested a paradigm for meaningful spaces, as shown in Figure 1; the proposed diagram explains a particular model of public space and activities, which could grant rise to creating new and shared memories among individuals of a community strengthen the space meaning.
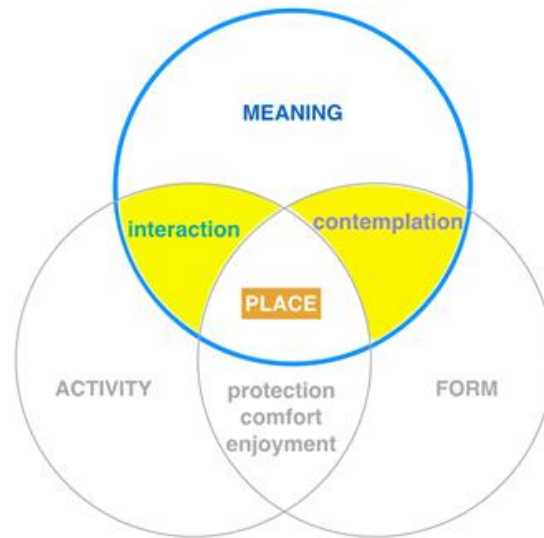
Figure 1. Meaningful spaces paradigm (Source: Montgomery, 1988)

4. METHODS

The study tackets the concept of placemaking and digital placemaking and the main factors that form the meaning of spaces. In this respect, six successful case studies from UK, Denmark, Montreal, New Zealand and Australia are selected. The cast studies applied design features to support digital placemaking in their public spaces. An analytical study is performed to illustrate the digital placemaking practices and the gained values and meanings. This study aims to extract main guidelines that can be applied in third world cities like the Egyptian, especially in new smart cities such as New Administrative Capital in Egypt.

5. CASE STUDY1: COLLUSION PROJECT KINGS LYNN

Collusion is an anon-profit organization set up in 2014 in King Lynn town, UK, which advocates making ambitious, creative, immersive, and interactive public art and events that respect the effect of emerging technology on public space (Morrison, 2019). Collusion designed a project around the Cambridge area called Reveal; it is a part game or part adventure that happened between 23rd November 2018 to 4th January 2019 in Kings Lyn. The interactive storytelling speaks about a story of a Syrian refugee, installed against the background of the streets and alleys of the Norfolk seaport town. Day after day, the narration is revealed by utilizing large-scale projectors, augmented reality, and live filmmaking shows. People could stop on a plaza, watching out for the project and where also they can get involved. Participants were summoned to actively discover the town, searching for the black and white symbol 'R' as shown in Figure 2, which they are able to scan the symbol by their

Figure 2. Collusion project Kings Lynn (Source: www.collusion.org.uk)

smart devices to pair the code and explore a new piece of the story (Morrison, 2019). On another side, Collusion closely addressed schools and community groups, covering about 300 children in coding and technological devices like fabricating digital lightboxes. These boxes can be used to interact with the story, as illustrated in Figure 3. The impact of this project explained clearly how digital placemaking could evoke and engage individuals to connect variously with the public space around them and with each other. Through narrating an unheard story, the project combined the history with present-day for a distinctive merged experience.
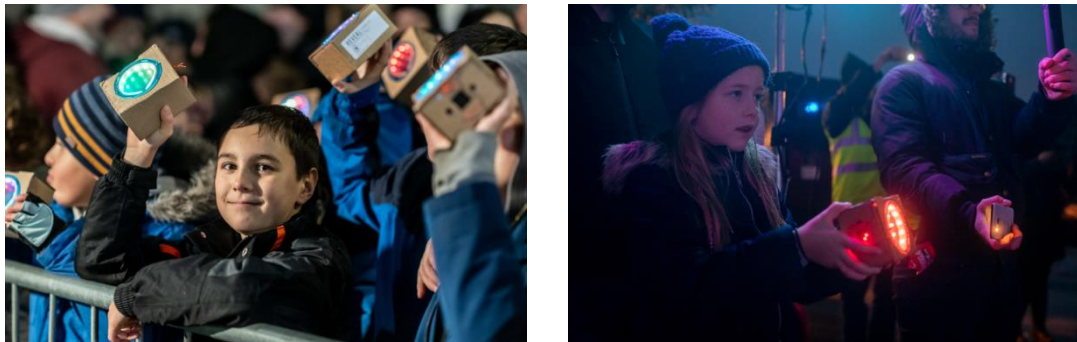

Figure 3. Digital lightboxes (Source: www.collusion.org.uk)

6. CASE STUDY 2: EVERYTHING EVERY TIME (ETET)

ETET project, In Manchester city, is a piece of digital writing produced through real-time from overtly available city data and displayed on a fabricated flip dot screen across the streets (Hemment et al., 2020). It is an artwork that receives data and information from individuals' interactions within the public spaces to tell stories about people and daily news. As inhabitants interact with the city, words are generated. Thinking about the data that transmits throughout the city fabric every day raises the attention for the role of data in people's lives and the gained value from that data. ETET collects data streams from various sensors detecting weather, traffic, and travel. This information is

transformed into an ephemeral, poetic story that reflects a glimpse into the wideness of technology in the urban space, as illustrated in Figure 4.

Figure 4. the generated words by ETET in Manchester city (Source: https://futureeverything.org)

The aggregated dataset was utilized to formulate more than 150,000 distinguish phrases, for example like: (Hemment et al., 2020):
"The sun rises"- "The streets are empty"- "Today is the last day of the term"-"The car park is almost empty"- "Traffic light turns green"- "The bus is on time"- "It is colder than today".
Besides installing the sensors, the project generated a podcast that provides a closer look at the stories from the city. Visitors are welcomed to go deeper into the city and listen to individual stories of some of its dwellers. It seems this work is capable of achieving what is thought to be impossible; it turns data on aspects like traffic, weather, and travel into meaningful phrases that indicate humanity and beauty. In this respect, ETET offers further, concrete connections between individuals and the city.

7. CASE STUDY3: STARLING CROSSING PROJECT, LONDON

The starling crossing was developed to offer smart interactive pedestrian crossing to aid users crossing the roads by projecting real-time zebras crossing, stopping lanes, markers for drivers, and indicating the appropriate moment of stopping and slowing down. The project aims to meet the needs of 21st-century roads safety, whereas familiar road crossing signs and marking are used. Nonetheless, it differs in being a responsive real-time system developed to prioritize people's safety, as shown in Figure 5. The prototype of this project was initiated in southern London (Plamadeala, 2019). The whole passage zone is monitored by sensors and cameras in which pictures are saved in a neural network that can recognize cyclists, cars, and pedestrians. The system can also identify the location and velocity of each traffic participant, and consequently, it can predict the participants' next locations and steps.

Figure 5. The Starling Crossing (Source: https://umbrellium.co.uk/)

The smart crossings and signs show up upon real-time need. Aside from the crossing locations, if a person is distracted and becomes too close to cars, the nearest cyclists and vehicles notice a warning pattern light up surrounding them. Likewise, if a child rushes into a road, a buffer zone lightens around them to warn oncoming traffic of their presence. This project indicates how digital appliances can convert busy urban cities into safer, welcoming spaces for all people, which is supported by real innovative methods; starling technologies is an excellent example of a pioneering vision that manages to put people's safety at the center of urban mobility systems.

8. CASE STUDY4: ADAPTATION OF HUMAN SCALE

Indeed, there is a remarkable shift in media architecture from the huge and costly media facades that mainly address many people and support the prestige of a specific product (Haeuslar et al.,2012) to delivering interactive experiences that address a much number of citizens. One of these features that provide an interactive process is enjoyment throughout opportunities to see and listen. A great example, for this respect, is Interference (Hespanhol &Dalsgaard, 2015). It is an interactive Tunnel that serves cyclists and pedestrians under a loaded highway in Kolding, Denmark. The tunnel includes a series of illuminated sheets fixed along the two sides of tunnel walls, the lighting panels equipped with strip-wire sensors that track the appearance of pedestrians. When individuals walk through the tunnel, sequential panels light up beside and opposite them, while panels behind them turn off, creating an illuminated tracker of walkers besides tunnel walls as depicted in Figure 6.

Figure 6. Interactive Light Tunnel, Denmark (Source: https://www.trendingcity.org/)

When multiple users walk in the same direction, anyone in front is warned about the appearance of those approaching behind. In the case of moving oppositely, lighting panels collide to predict their physical encounters. By addressing users at their scale and being adapted to that specific built environment, the project transforms the tunnel into a social space, offering it meaning and identity delivered by individuals using it.

9. CASE STUDY5: LIVING CONNECTIONS BRIDGE

Living Connections Bridge refers to the *Datascape* of Montreal, as it presents in a real-time show called the pulse of the city; it has been granted the interactive innovation prize by the Southwest festival (Alexandra, 2019). In 2017, for Montreal's 375th and Canadian celebrations, a huge-scale interactive illumination project for the Cartier Bridge was installed in Montreal, as shown in Figure 7. This flagship scheme, which will remain ten years, is titled Living Connections and was envisaged by internationally famed Montreal firms Moment factory and more than 200 participants in the project (Moment Factory, 2019). More than   2807 LED Lights were fixed on the bridge's steel structure that required about 10 Km of data cables to transfer data and electricity. Predominant colors represent four seasons that are changing gradually from summer in orange to fall in red; in the winter, the bridge becomes blue and green during spring. Besides that, the LEDs react to tweets from Twitter in real-time, varying their density, running speed upon the hashtags that the system analyses, such as #IlluminationMtl, #Montreal.

Figure 7. Living Connection Bridge (Source: Alexandra, 2019)

The installed sensors track the routing of vehicles, bikes, and people. Those data are compiled every hour during the day, blended with other data, and projected throughout remarkable animations. In addition, at night, every hour collected data concerning weather, traffic, news, and main festivals are displayed in a five-minute animation show. The prevailing color is related to the most debated topic in Montreal media; for example, blue indicates sports events, red for social matters, purple reflects culture, light blue for technology, and green addresses the environment. Then, after every half-hour, there is a minute for scintillation to show (Alexandra, 2019). The bridge is idiosyncratic to the city, as Montreal owns an intricate hydrographic network; consequently, its bridges are directly connected to its daily dynamics. During summer, a significant firework celebration occurs that can be displayed on the bridge, which is dedicated to the festival, providing privileged upper view spaces. So, the bridge is not only a transit road but also is one of the gathering spaces during special events. The name of the bridge as "Living Connections" reflects a double meaning to the project; it

refers to the connections between all compiled data by the surroundings and interprets into lights. The word living points to the dynamism of the artwork, which works as a living thing reacting to the living pulse of Montreal (Moment Factory, 2019). Living Connection Bridge is a symbol of placemaking commemorating the historical structure that is already considered a landmark and providing it with an added value and branding Montreal (Lew, 2017). A map is added on the website to promote this experience, as shown in Figure 8, suggesting the best lookout points to the visitors.
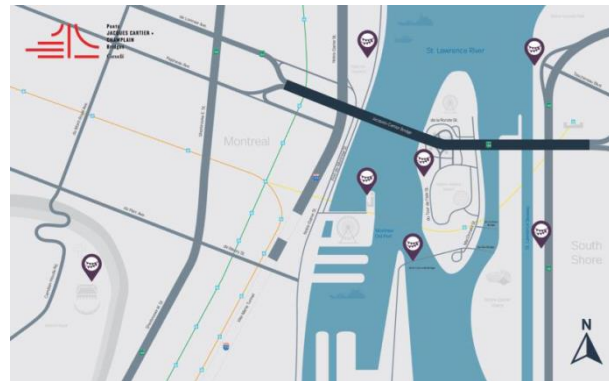

Figure 8. Recommended viewpoints to the Bridge (Source: Alexandra, 2019)

10. CASE 6: PROMOTING PERSONAL AND SOCIAL INTERACTIONS

One of the significant aspects of empowering interactions in public spaces is to maintain their public identity, giving other individuals in the surroundings the choice to become passive onlookers or- if they decide so- to participate in the action happening in the space. However, sharing in activities with a digital application in public may also cause the probability of embarrassment, in particular when the interactive tool is experimental or new to individuals. In this case, the experience may fail to be delivered to a wide range of target communities (Hespanhol, 2018). A well-known example for offering individuals clear opportunities to present their thoughts

with enough privacy is the InstaBooth (Caldwell et al., 2016). The InstaBooth is a movable urban installation in the form of a multimedia telephone cabinet. It encourages community engagement, which offers a variety of digital and analog applications for

people to express and visualize their ideas, from stick note papers to digital screens and projectors showing Twitter updates or photos from social media Apps (Figure 9).

Figure 9. The InstaBooth (Source: https://research.qut.edu.au/)

In this respect, another example supporting the idea of community engagement is Dance-O-Mat (Hespanhol, 2017), which has been provided in street networks in Christchurch, New Zealand, designed by a group of artists and scientists. The project stands as the epitome of long period performative public space. The designers created ad dancing floor supplied with speakers and illuminations fixed on each side of the dance floor. The attracted dancers, all they have to do is to insert a coin on a machine slot, connect their mobile phones, and select their preferred soundtrack to be played, and they start dancing for 30 minutes. This work embodies many other aspects like being addressed for human scale and open to smart allocation. A common strategy for cultivating meaning in the relationship between people and public spaces is to organize events regularly and simultaneously offer different storylines in each iteration (Hespanhol, 2018). For example, people can know cultural content that occurs in a specific location every month, with a different method of attractions.

 Another example that supports integrating art and technology is Vivid Sydney in Australia and Nuit Blanche concept; these examples host various light installations at night in city centers, as shown in Figure 10. This idea started in France in 1980 and went viral to many cities globally (Evans,2012). As a result of the technology choices, most digital media platforms and digital placemaking practices have conventionally counted heavily on light-based technology like displays and mega projection that depend heavily on visual perception. However, well-chosen placemaking requires delivering to all community members, encouraging their activities and participation. To provide a higher level of inclusion, a growing number of digital placemaking treatments have started to offer a balanced variety of choices for interaction, developed to integrate different senses. That engages particularly the listing of radio, touch-based appliances,

and immersive interfaces where people are welcomed to mobile around with their physical bodies (Hespanhol, 2018).

Figure 10. Vivid Sydney Source: https://www.dailytelegraph.com.au/

Canada presents another example of creating placemaking by the Megaphone (Hespanhol et al., 2017); it is a temporary urban fabrication created for the Quartier des Spectacles, Montreal. It contains a fabricated megaphone situated in a plaza, in which people can move and begin speaking through it. Selected themes were orderly posed to the public talks. As individuals spoke on the megaphone, the phrases were analyzed by the adjoining building, displaying a visual expression of the public sentiment inside the space. Significantly, it is not only the megaphone or the projections alone that identify the experience but also the integration of both modalities that cultivate the meaning of individuals' empowerment through participation and immediate magnification of the words.

Figure 11. Megaphone, Montreal Source: https://www10.aeccafe.com/

Another project, engaging digital applications, is the creative installation "Digital Calligraffiti (Manach & Pop, 2017), which summoned teenagers from a refugee camp located in Berlin called Lebenswelt, and electronic specialists. Digital platforms aided the installation; the specialists rendered and interpreted hand-written words from the refuges into animated images and then presented them on urban screens in different

places in the city, raising awareness of the town's migrating cultures. It is a strong storytelling based on the refugees' past background, memories, thoughts, and insights for the future. The previously discussed cases indicated the possibilities for the application of digital placemaking to cultivate meaningfulness inside urban spaces; they can be considered as emerging guidelines for the digital placemaking of meaningful places.

Figure 12. Digital Calligraffiti, Berlin Source: https://awards.mediaarchitecture.org/

11. RESULTS

The research findings are divided into two sections; the first section analyses the international digital placemaking endeavors and their impact on perceived values and meanings in urban space. While the second part provides main guidelines that can be applied to third-world cities, particularly the Egyptian local context.

11.1 Case Studies Summary: The Intertwining Factors between Digital Placemaking and Meaningful Spaces.

The previously addressed cases provided dimensions that can be considered while designing meaningful urban spaces through digital placemaking to boost people's sense of place and their engagement with the local community. The following table, Table 3, illustrates the gained values through these different practices.

Table 3. Cross-cutting relationships between digital placemaking and meaningful spaces

Case Studies	Digital Placemaking Practices	Gained Values and Meanings
Case 1	-It provides an interactive storytelling speech performed inside public spaces, using large-scale projections and augmented reality. -It makes people a part of the story and encourages them to discover many parts of the story in different places in the city by scanning a black-white code with their smartphones.	(***Interaction***) through a display of collective mood, visualization increased community participation and user engagement inside the space.
Case 2	Explains how an artwork receive the data from inhabitants or user inside the public spaces and transform these data into words reflect stories about people and daily news	(***Enjoyment and belonging***)This project generated more than 150000 distinguish phrases that provide a closer look at the stories from

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Case studies	Digital Placemaking Practices	Gained Values and Meaning
		the city, in which collected data is transformed into meaningful phrases echoing the spirit of community, sense of belonging, and being heard.
Case 3	It provides a smart interactive pedestrian crossing monitored by sensors that can recognize mobility networks for cars, people, and cyclists and predict probable collisions.	(*Protection and sense of value)* The project put people's safety/ protection at the center of urban mobility, in which safety is one of the main core factors that form meaning inside the space.
Case 4	It discusses an interactive tunnel that serves people and cyclists; the tunnel is equipped with lighting sensors that interact with people moving and creates an illuminated tracker of walkers.	(*Activity- interaction – enjoyment)*The project focused on the human scale and being sensitive to their moves; it transformed the tunnel into a sociable space.

Case studies	Digital Placemaking Practices	Gained Values and Meaning
Case 5	It presents a real-time show that reflects the pulse of the city. LED lights fixed on the bridge structures and equipped with sensors that react to tweets from Twitter in real-time, giving changeable colors reflecting the occurring matters between inhabitants.	(*Activity- Enjoyment informative*)According to users ' preferences, the project offers an added value by altering this location, which increases social engagement and reflects people's thoughts that can enrich freedom of choice and add a human meaning to the historical bridge.
Case 6	Movable urban installations are enhanced with multimedia devices in order to encourage people to participate and express their ideas; the equipment includes sticky notes, digital screens, and projectors.	(*Comfort- Interaction- belonging -emotional link)* The experiences assured the answerability for messages running among the public, empowering interaction in public spaces that maintain the public identity.

Source: The authors

11.2 Recommendations for Digital Placemaking Practices in the Third World Cities

This section presents the main guidelines for digital placemaking extracted from the selected international case studies. Though some practices require a high level of technology or complicated infrastructure for massive data processing, others are easier to apply and still create the necessary level of placemaking. Nowadays, smart cities are emerging in new city planning in Egypt. The New Administrative Capital is being developed as Egypt's first smart city, integrating smart infrastructure, smart energy

management, smart traffic, and smart buildings. Therefore, digital placemaking would be a suitable tool for creating better open spaces that cater to users' needs and aspirations

11.2.1 Flexibility of urban amenities and furniture

Planning bottom-up, societal, cooperative, and smart interventions in specific elements of public places like urban furniture by enveloping them with extra layers of meaning like smart poles, recharging units in seats or shade structures, digital signage, and light sensors without contradicting their main functions as Figure 13
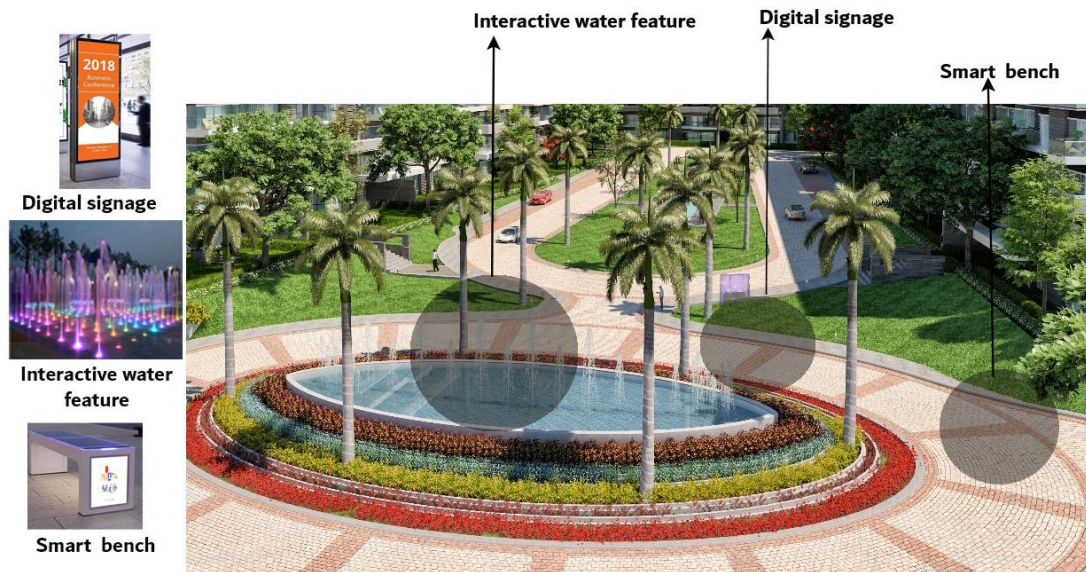

Figure 13. Suggested alterations to create digital placemaking at a public space in a residential neighborhood in New Administrative Capital, Egypt. Source researcher

11.2.2 Addressing human scale

Instead of determining the whole precinct, digital placemaking can adopt specific items of public space concerning the human scale, by making them more accessible and related to the users' preferences. In doing so, interactive smart devices can be added, including creating activities for watching, seating, talking, listing, and playing, as Figure 14.

Using digital signage

Using digital bus stations

Figure 14. Suggested design for street furniture to support digital placemaking Source researcher

11.2.3 Openness to creative engagement

Digital devices installation is the main core for constructing digitalized urban spaces, so these smart technologies can be augmented in different ways among users and make people part of the story happening inside the space; thus, people's thoughts are empowered and expressed.

11.2.4 Considering personal and social interactions

A significant way of enhancing interaction in public spaces is to maintain public character. Digital screens and art walls are important factors that encourage people to express their opinions without compromising privacy. In addition to catering to different age groups and using mobile apps to create a character for the space, for instance, certain virtual games as Figure 15.
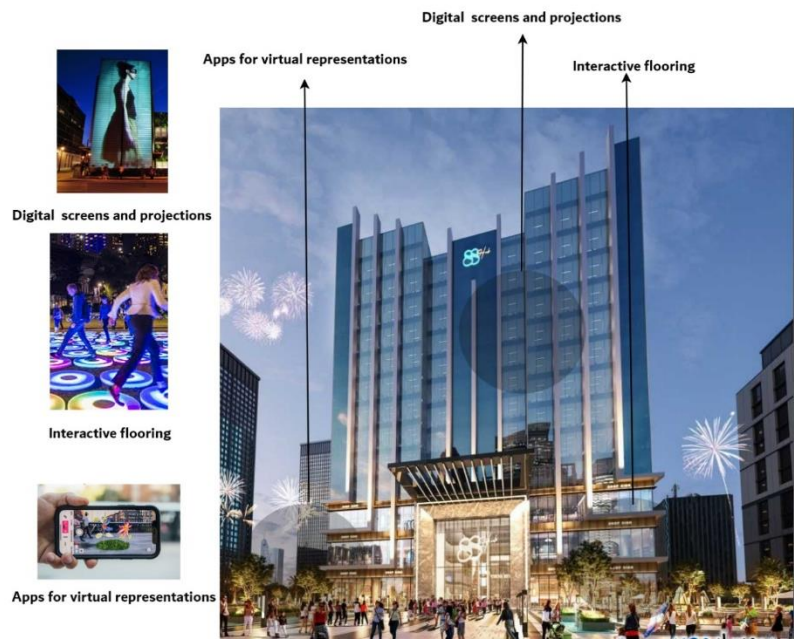
Figure 15. Suggested alterations to create digital placemaking at a public space in a commercial district in New Administrative Capital, Egypt. Source researcher

11.2.5 Periodic repetition and gradual change

A popular approach for cultivating meaning in public spaces is to organize events or shows regularly, such as cultural programs that express the different races or origins of the city residents.

11.2.6 Linking memories past, present, and future

A strategy of linking people back to the space is to design the content of urban amenities by increasing the aggregate of their collective memories and making them contemplate and think like presenting digital calligraffiti representing a special meaning or images of the space history or the future vision on the city.

12. CONCLUSION

This research tackles digital placemaking concepts and practices as a growing trend in smart cities. Digital placemaking presents a virtual environment to link place, and time with people to create connection, belonging, and meaningful experiences inside public spaces. Although applying the concept is still experimental in many countries. Nevertheless, it successfully created a unique image for spaces. Spaces adopting the concept attracted all types of city dwellers, especially young people, to express their options and tourists to experiment the new technology. From a critical point of view, digital placemaking needs in some aspects complicated technologies and professional operation and maintenance teams. Another claim is that it may lead to more isolation and dependency on the digital world. However, there is no doubt that digital placemaking obtains great potential and holds inspirations by architects and urban designers to deepen peoples' interaction with public spaces. Understanding the local community and spaces' characteristics is fundamental to customize the appropriate

digital placemaking strategies that can attract and entertain users without overstimulating their sense and creating a chaotic ambiance.

This research is a trial to rethink the intricate relationship between technology and placemaking, where creative digital environments stand out to enhance the quality of life of city dwellers. This research provided a preliminary examination of evolving design trends towards the people-centered design of public spaces augmented and aided by interactive digital media and technologies. Digital technologies that emphasize specific experiences co-developed with local communities to cultivate meaning in the spaces and boost social activities. More research and investigation are needed to unravel the way the space can be better perceived through these technologies, as well as strengthen the connections between collected data and the lived experience.

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