

Understanding spatial configuration and temporary appropriation of the street as public spaces in Latin American cities: the case of Mexico City Centre

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ABSTRACT: A vast literature discusses the physical attributes of built environment for the purpose of creating lively and inclusive public spaces for the sake of its temporary appropriation by citizens. Here the term temporary appropriation is defined as the act in which people use public spaces to carry out individual or collective activities other than the purpose that the space was originally designed for. The paper reviews relevant literature and analyses urban design elements of the spatial configuration of the street that are related to the temporary appropriation. Its main objective is to identify urban design elements of spatial configuration of the street supporting diversity of temporary appropriation and explore this relationship in Mexico City Centre. The analysis and the study of the selected case study may provide insight and contribute to a better understanding of this relationship (appropriation and spatial configuration) within heritage city centres in Latin American cities.

1 INTRODUCTION

Mumford (1938) claims that among the physical spaces where the human inborn need to interact occur (town, village, and the city) the city, above all else represents the *theatre of social action*. The creation of environments that support social interaction in places is therefore a fundamental aim of urban design (Mehta 2013). Mumford's aforementioned definition suggests the existence of a *dialog* between people and physical space or environment, which is spatialised through people's activities occurring in the space. This *dialog* has been defined differently over time through expressions such as *street ballet* by Jacobs (1961) or the *space of contact* by Choay (2001), which capture the idea of a space where all the different social encounters happen i.e. people playing, walking, sitting on a table drinking a coffee, etc. According to Anderson (Anderson 1986b) the expectation of daily human contact that public space offers is unique. When public spaces do not allow this contact, one of the possible risks is the rise of alienation, which contributes to social stress, space neglecting and crime rates rise. Moreover, since motor vehicles have taken over most of the street space the only place where the *street ballet* occurs is on the sidewalks.

Over time, the street has proved to be a spatial typology able to accomplish the role of public space (Mehta 2013). This accomplishment is reflected on the meaning of public space which is given by society and it is generated through urban design, planning and management; but more important it is produced through the use and appropriation by the users.

The street as a spatial element of the city is versatile and susceptible to be transformed. Also when its use is constrained, the street can still host a high degree of activities and variety of uses, it can be re-shaped and its boundaries re-defined. Even though the citizens

perception of the street is often that of channels or space within borders (Lynch 2008), other scholars (Jacobs 1993; Gehl 2011; Appleyard et al. 1981; Mehta 2013) have highlighted the relationship between urban life and people's activities performed in the streets. People depend on the street for functional, social and leisure activities, including shopping, praying, interacting with other people, relaxing or even surviving. Streets and sidewalks are the place where socio-economic and cultural differences among citizens are more evident, underlining the local tensions between different groups (Loukaitou-Sideris & Ehrenfeucht 2009, p.129).

In the case of Mexico City, its city centre, declared UNESCO heritage site, has played a key role in the recent years. The declaration has, in fact, triggered the beautification of the built environment through urban design transformation in order to improve the quality of life. However, scholars (Ramirez Kuri 2015; Oehmichen 2010; Díaz Parra 2014) have pointed out that since the temporary appropriation of streets is an essential characteristic of public spaces in the Mexican context, urban transformations have triggered a deterioration of public space.

The government of Mexico City also promoted inclusiveness and universal design through prescriptions regarding the use of public spaces (streets and squares) and their accessibility for every citizen without any distinction or impediment (Gobierno del Distrito Federal 2013). However according to Delgadillo (2014), regulations over the use of public space have been imposed to areas that had been already renovated. These application of the regulations follow three patterns: first as a juridical framework that allows the government to displace users (informal use, suspicious behaviour or misbehave); second as a cultural agenda that facilitates the occupation of the public space by free cultural and amusement events (also promoted by the government) that erode the social dimension of public space; and third the zero-tolerance agenda which includes the increment of police officers and surveillance in the area (Delgadillo 2014).

1.1 The relevance of appropriation in the urban context, a theoretical approach

Herein the term temporary appropriation is defined as the act in which people use public spaces to carry out individual or collective activities other than the purpose that the space was originally designed for (Fonseca Rodriguez 2015a). This section describes from different theoretical approaches the concept of appropriation of the street as public space. It also illustrates the relevance of this theoretical concept to understand the relationship between people and public spaces. Even though there is not a consolidated theory on appropriation other theories incorporate and approach the concept claiming that it plays a key role in the bond between people and places and therefore in the social construction of the public space.

In 1976 the term appropriation was introduced to the scientific community within the environmental and psychology disciplines. Advocates of appropriation claimed that the individual constructs himself through his own actions in a socio-cultural historic context. Accordingly to Korosec-Serfaty (1976) the appropriation is a temporary phenomenon, meant as a dynamic process of interaction between the individual and their environment. In 2002 Pool (2002) proposed an appropriation dual model describing the relationship between people and space: these relationships are action-transformation and symbolic-identification. The action-transformation is the action of people or groups in which they transform

the space by leaving their trace as an expression of their identity (Altman et al. 1973). The symbolic identification is related to affective, cognitive and interactive processes of people or groups in which they identify themselves with the environment (Vidal Moranta & Pool Urrútia 2005). The appropriation is one of the most important concepts that philosophical reflections have bequeathed (Lefebvre 1971, p.164). Human beings are engaged with the appropriation of the environment (Yory 2011, p.13) as a connatural condition. Regarding the urban context, the appropriation of public spaces in every society is pivotal: without appropriation there is no social development within society (Madanipour 1996). The actions of human groups in the built environment and spaces have two modalities: the domination and the appropriation. Lefebvre (1971) also argues that without appropriation the domination of nature do not have a sense. In other words, there is no urban realm if public spaces are not appropriated. Moreover, without appropriation, the economic and technological development of the society is possible but the social development remains null (Lefebvre 1971, p.165). Following the ideas of Lefebvre (1992) Purcell (2002) argues that the appropriation of public space is embedded in the second aspect of the right to the city which includes the right of inhabitants to physically access, occupy, and use urban space. Moreover “not only is appropriation the right to occupy already-produced urban space; it is also the right to produce urban space so that it meets the needs of inhabitants” (Purcell 2002). Therefore, in a broad sense appropriation is established by the interaction between citizens and their city (public space), between the social realm and the physical realm (Contreras 2008). Both realms are constantly interacting as different layers of the urban landscape in the city; the product of this interaction is the expression of urban life.

Yory (2003) also discusses the term of appropriation which is implicit in his definition of topophilia. The author develops *topophilia* as a philosophical concept claiming that it is an inborn necessity of humans. This inborn necessity is what triggers the creation of the bond between people and places. The term topophilia was introduced by Tuan (1974) from a different perspective which has an emotional character; reduced to an emotive and affective relationship between man and place. Yory (2011) push forward the concept and brings the term to the spatial and geographic realm which concern urban design; defining *topophilia* as “the act of co-appropriation generated between the man and the world; through which the world becomes world, at the opening realised by the man within its historic-spatial nature and human becomes human through the spatialisation” (Yory 2011, p.45). Thus, the interpretation of this concept in a city implies that when people appropriate the public space they become citizens. The lack of topophilia erodes the bond between people and places. Moreover, the absence of appropriation is characterized by the denotation of the lack of congruence between the physical landscapes and place meanings held within broader physical, cultural and emotional context (Ujang 2012). Therefore, the temporary appropriation is a key concept for establishing theoretically the link between people and places.

A vast literature discusses and analyses the physical attributes of built environment for the purpose of create lively and inclusive public spaces for the sake of the appropriation (Gehl 2014; Jacobs 1961; Whyte 1980). Several papers (Hidalgo et al. 2014; Hernández Bonilla & Gómez Gómez 2015; Carrión 2013; García Espinosa 2005) deal with the effect of transformation of the built environment towards the use of public spaces in city centres in Latin America. However few consider it from the perspective of the public spaces and their temporary appropriation, and even less explore the urban design elements that could be implicated.

1.2 *Issues in the Inclusiveness and temporary appropriation in public spaces in Latin American cities: the case of Mexico City*

Currently, a broad discussion concerning the use and function of public spaces in Latin American cities and their role supporting a vibrant and inclusive urban life involve several scholars (Ramirez Kuri 2008; Carrión 2007; Sequera 2014). Among them Gutierrez de Velasco Romo and Padilla Lozano (2012) have analysed the temporary appropriation of public spaces in central areas focusing specially in the Mexican context. They found out that public spaces located in central areas of city, are used by a wide range of people and they appropriate such spaces through different activities (eating, selling, waiting for other people, shoe-bowling, singing, performing, reading, etc.). They also suggest that the urban design of public spaces should contemplate those different forms of appropriation in order to achieve more inclusive spaces. If the different forms of temporary appropriation of public spaces are not considered by urban design practice the social inequity, urban segregation and social exclusion in a determinate area could increase (Vidal Moranta & Pool Urrútia 2005); as in the case of city centres in Latin America such as Buenos Aires and Mexico City (Capron & Monnet 2013). In the Mexican *Xalapa* (Capital City of the state of Veracruz located in the Gulf of Mexico) the spatial configuration (*land use, complexity*) of streets located in central areas was changed through urban design interventions and now users claim that they have been deprived of the possibility of appropriating them (Hernández Bonilla & Gómez Gómez 2015).

1.2.1 *Heritage protection in public space in Mexico City Centre*

As mentioned above, within the context of Latin American cities, the Mexico City Centre provides a good example of the urban design transformation processes of public spaces in world heritage centres.

The Mexico City Centre (MCC) was declared a world heritage site by the UNESCO, thanks to its uniqueness, authenticity and integrity of the built-environment and culture. In order to preserve the place (built environment and culture) for future generations, the main objective of the declaration is to preserve the quality of the existing physical and social realm (UNESCO 2013). This declaration lead to a commitment between the Mexico City government and UNESCO (2015) aimed at the conservation of the built environment and the protection of the local culture. Regarding the built environment, the objective is addressed through continuous maintenance of façade and through urban design transformation of the public spaces. Culture refers instead to the particular uses, expressions and meanings of the people. Those particular uses, expressions and meanings demonstrate the local culture through the people's daily-actions taking place in public spaces which are an act of spatial appropriation (Certeau 1984; Casakin & Bernardo 2012). The simplicity of people's daily actions is part of the local identity (Belanger et al. 2012).

1.3 *Streets as public space in the history of Mexico City*

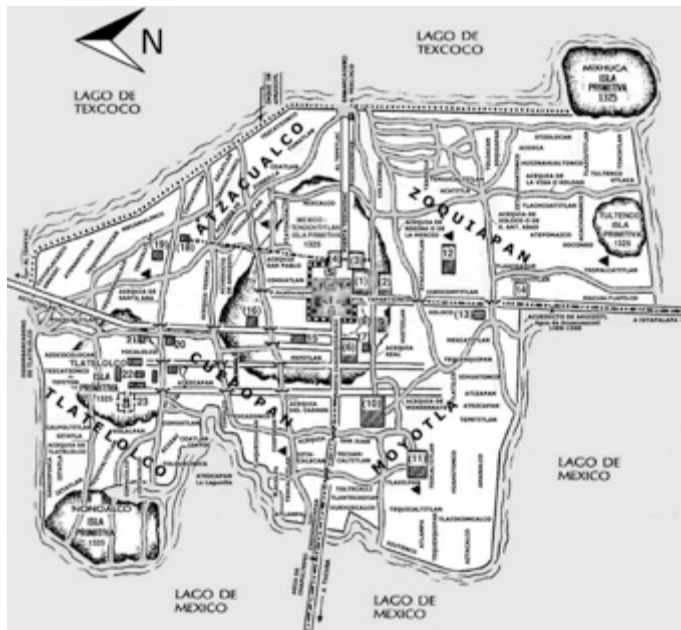


Figure 1 Tenochtitlan. Schematic representation 1325-1519. Source: M. Carrera Stampa

The streets of Mexican cities are public spaces that were key for the urban life even prior to the Spanish colonisation. The pre-Hispanic civilisations were characterised by the intensive utilisation of the outdoor spaces for everyday activities (Keller 2006; Suárez Pareyón 2004). The Aztecs were the civilisation that founded Tenochtitlan (Mexico City was built on top of it (Figure 1), and they were not the exception. The urban pattern of Tenochtitlan was formed by blocks, streets and channels. The Aztecs used the channels for communications purposes while streets for a diversity of activities such as trade, leisure, religious celebrations or even sacrifices (Leon Portilla 1995). The streets were the public space in which the social, political, economic and religious life of people manifested (Webster & Sanders 2001). The informal activities were an essential element of the street life, specially for the common population of society (Crossa 2009). Figure 2 exemplifies the quotidian urban life in Tenochtitlan.

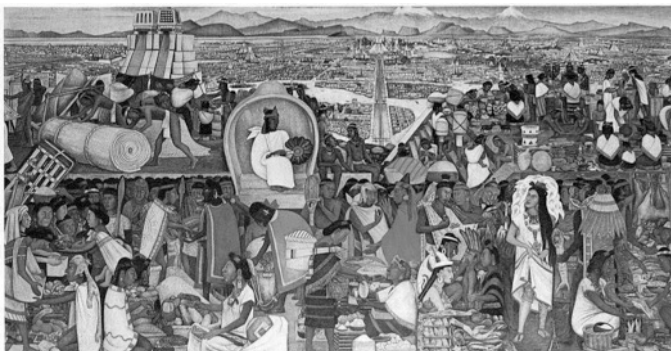


Figure 2 The great Tenochtitlan, mural by Diego Rivera from 1945. Exhibited in the Palacio Nacional in Mexico City. Source: Internet

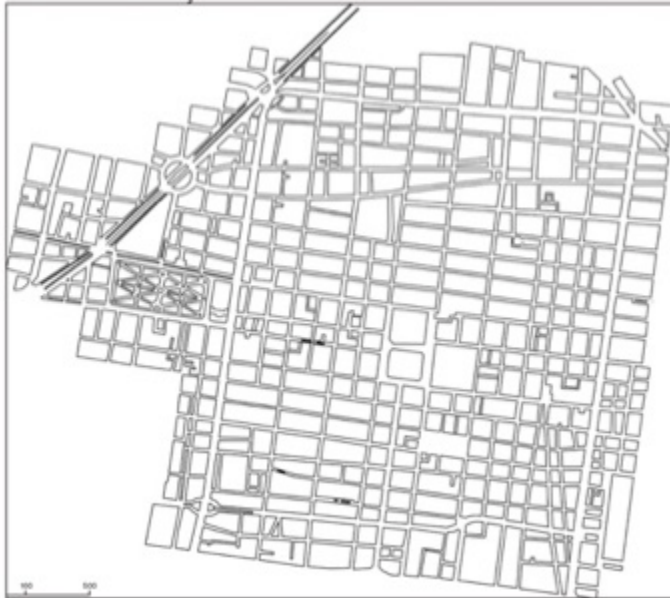


Figure 3 Mexico City Centre. Source: Autoridad del Centro Histórico

In the XVI century during the Spanish colonization a new urban planning pattern (Figure 3) was established over Tenochtitlan and therefore transforming the city (Stanislawski 1947). The conquerors tried to regulate the informal activities (trading, playing, religious expressions, etc.) happening on each specific street for each activity with a singular order (Nelson 1963) by confining them into specific places such as squares in the Spanish tradition. They succeeded for a short period of time but as the city expanded, the confinement of the informal activities was no longer viable. As Monnet (Monnet 1995; Monnet 1996) describes, this types of temporary appropriation are still palpable in the streets of Mexico City.

1.4 *Inclusiveness and temporary appropriation of the streets in the Mexico City Centre*

This new set of rules over the use of public space and how it is managed threatens the inclusive and pluralistic nature of public space (Ramirez Kuri 2008; Saraví 2008; Alessandri Carlos 2014). This situation is putting at risk the temporary appropriation of public spaces which according to Purcell (2002) is one of the key elements to exercise their right to the city as citizens.

Within the Mexican context, the Mexico City Centre is the one that has been physically preserved (buildings façades), transformed (public spaces) and invested the most (Delgadillo 2014). According to the report of Autoridad del Centro Histórico (2014) between 2007 and 2014 an approximate 82,579 m² and 10.3 lineal km of public space (streets) have

been upgraded with an economic investment (public-private) of more than \$5,340,200,000.00 pesos (£232.182.608,70). The urban design intervention, carried out in association with private institutions, includes: change of pavement, pedestrianisation, sidewalk expansion, and the addition of urban furniture, lighting and trees which are transforming the spatial configuration. Figure 5 shows the condition of 16 de Septiembre Street in 2009 before any urban design transformation. After the urban design transformation took place in 2013, pavement was substituted with new and more attractive patterns, street lighting was improved, trees were planted, and urban furniture and elements for the disabled people were added. Figure 6 shows the current situation of 16 de Septiembre Street in which the spatial configuration of the built environment was transformed and the presence of people has been decreased. Streets such as Madero, Regina, 5 de Mayo, Del Niño Dios, Talavera, Leandro Valle, Mariana Rodríguez del Toro de Lazarín, Dolores and Independencia have undergone similar urban design interventions. According to *Autodidad de Centro Histórico* (2016) which is an autonomous and decentralised institution that manages urban design interventions in the MCC, other streets such as Seminario, República de Guatemala, Tacuba, Avenida Hidalgo y Puente de Alvarado, San Jerónimo, Vizcaínas, Aldaco, Jiménez, Callejón Esperanza and Meave are planned to be transform in the near future. Figure 7 illustrates the transformed areas, areas under process of transformation and areas for future transformation in the MCC.



Figure 4 Picture of 16 de Septiembre Street taken on July 2009 during a normal day. Source: Google Maps



Figure 5 Picture of 16 de Septiembre Street taken on July 2014 during a normal day. Source: Google Maps

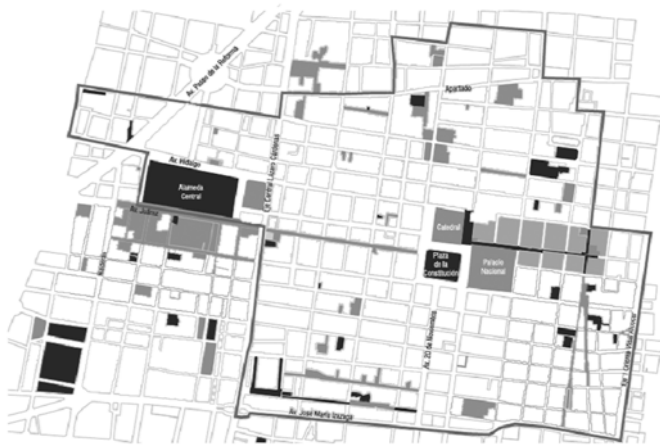


Figure 6 Executed projects and projects in process in the MCC. Data from 2015. Source: Autoridad del Centro Histórico

1.5 *Temporary appropriation and elements of the spatial configuration of street*

Moudon (1991) maintains that the spatial configuration of the built environment is a high-pitched display of cultural specificity by claiming that each type of society generates a particular behaviour and it is reflected in the way they use the street. Which urban design elements of the spatial configuration of the street may affect the temporary appropriation? Based on literature reviewed, the following paragraphs describe urban design elements of

the street (land use diversity, softness, visual-complexity, sedibility,) that are strongly related to the temporary appropriation of public spaces. The following Table 1 summarises the literature.

Table 1 Elements of the spatial configuration of street related to the temporary appropriation.

Element	Description	Relevant author
Land use	The main activity taking place in a building facing the street at ground floor level.	Jacobs [3], Gehl (2011), Bentley [39], Mahdzar [40].
Softness	It is split in two: 1) Transparency corresponds to the possibility of engage visually from a building's interior to the street (glass windows or doors). 2) <i>Transitional space</i> that are the spaces visually accessible from the public realm such as stoops, porticos, entry setbacks and balcony awnings.	Jacobs (1961). Gehl (Gehl 2011; Mahdzar 2008). Porta and Renne (Porta & Renne 2005) Anderson (1986a).
Visual-Complexity	Here the visual-complexity of the built environment (street) is referred as the variety of the streetscape at a multi-dimensional level (colours, street furniture, and street pavement).	Bentley (Bentley et al. 1985; Gibson 1986; Scarantino 2002), Kärholm (2007)
Sedibility	It is the possibility for places for seating that a public space offers (benches, chairs, curbs, stairs, etc.).	Whyte (1980), Gehl [8](Gehl 2011; Blanco et al. 2014; Salazar Trujillo 2010).

However, there are uncountable activities occurring on the street hence, what kind of activities happening on the streets are the one that people can appropriate?

1.6 Activities and the temporary appropriation

According to Sansot (1976) people only appropriate places in which they feel identified. Also, Torres (2009) argues that the appropriation of public space has a strong value for people since it is culturally constructed by everyday activities. It implies that appropriation of the space plays a key role for people's identity and their interaction with their environment.

Even though there is a wide literature describing the importance of the use of the space in which people through activities appropriate public spaces (Korosec-Serfaty 1976; Gutierrez de Velasco Romo & Padilla Lozano 2012; Alessandri Carlos 2014; Fonseca Rodriguez 2015b) few studies really specified or classified such activities. Table 2 identifies activities happening on public spaces that lead to the temporary appropriation.

Table 2 Elements of the spatial configuration of street related to the temporary appropriation.

Activity	Description	Relevant author
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Trade	Commerce and trade activities taking place on the street.	Ramirez Kuri (2010), Gutierrez de Velasco Romo and Padilla (2012)
Leisure	Activities related to leisure such as arts or sports occurring on the street.	Cranz (1982), Crouch (1998), Mouffe (Mouffe 2007)
Sacralisation	It refers to religious symbols (mostly catholic) are placed in public space. This appropriation is characterised by the installation of crosses or altars in the public space where people use to pray. See Figure 1.	Portal (2009)



Figure 7 Altar on street in Mexico City Centre

2 MATERIALS AND METHODS

The present paper studies elements of the spatial configuration of the street that encourage/inhibit the temporary appropriation within the MCC. Two layouts are produced and overlapped, firstly the spatial configuration analysis and secondly the temporary appropriation mapping. Lastly the diversity index of the temporary appropriation is obtained in order to compare both streets. The elements of the spatial configuration of the street are studied through images with a method introduced by Porta and Renne (Porta & Renne 2005). The temporary appropriation is studied by a snapshot observation technique know as “activity mapping” (Francis 1984)(Mahdzar 2008). The following section describes them in detail.

2.1 Spatial configuration analysis

Elements of the spatial configuration were analysed using a method developed by Porta and Rene (2005) which identifies the formal elements of the built environment that interplay directly with the social realm of the street as public space. These elements are identified as indicators that are represented into plans, bird-eye views (i.e. photographs) and sections. The street indicators taken in consideration include: *land use diversity, softness, visual complexity and sedibility*.

These indicators are individual components that as a whole are related to the temporary appropriation of the street. This separation will help us to understand the design features that support higher levels of diversity of temporary appropriation. The measurements were taken using photographs along the street, 25 m apart. The camera was attached to a tripod at eye level to be sure that each picture captures the same field of view. Each photograph was analysed to collect the measurements for the indicators. Table 3 illustrates and describes the indicators and how they were assessed. As a part of an on going research the present article only illustrates the analysis and results of the *softness* indicator.

Table 3 Spatial configuration indicators description

Indicators	Sub-indicators	Outcome
Land use diversity	See	The value of land use diversity is calculated using the Shannon Wiener Diversity Index (See p. 28). The high diversity value of land uses the higher the value of diversity of activities.
Softness	<p>Transparency corresponds to the measure of the window space/area that face the street which allowing the view into the and out buildings.</p> <hr/> <p>Transitional space is a measure of spaces visually accessible from the public realm such as stoops, porticos, entry setbacks and balcony awnings</p>	Transitional space and transparency are measured independently and the result of each will be averaged to obtain a single measure of softness. Polylines will be drawn using AUTOCAD to identify the presence of transparency and transitional spaces for their calculation. Both sub-indicators belong to a different nature, hence the data will be normalized* before calculate the average.
Visual complexity	<p>Colours (high contrast, brightness, richness and the number of different colors).</p> <hr/> <p>Street furniture (seating art, attractive lamp post, raised planters, etc.).</p> <hr/> <p>Street pavement (changes in texture, color, material, patterns and attractive ending).</p>	This indicator is based on personal judgment. Each picture will be evaluated three times (one for each field) with reference to a 1-5. The output will be calculated as the average of all three sub-indicators
Sedibility	Primary seating refers to the objects made for people to sit which includes benches and chairs (movable chairs have a slightly higher rating).	This indicator is rated 1-5 giving priority to the primary seating.

Secondary seating refers to objects not specifically made for seating purposes but in which people are very likely to sit on. This encompasses walls, stoops, fountain borders, ledges, planters, sculptures, etc.

Adapted from Porta and Renne (Porta & Renne 2005)

* The term normalisation originates from statistics, and eliminates the unit of measurement by transforming the data into new scores with a mean of 0 and a standard deviation of 1. These transformed scores are known as Z-scores (Abdi & Williams 2010).

2.2 Temporary appropriation mapping

The diversity of activities as the expression of the temporary appropriation occurring on the selected areas of study were observed and mapped. Table 4 illustrates in detail the type of activities that were observed. Activities occurring in the public space related to criminal behaviour (vandalism, etc.), to political protest and to transit purposes were not analysed.

Table 4 Activities in public related to temporary appropriation.

Category	Commerce/service		Leisure		Sacralisation	
Description	Any activity in which a person or group use the public space in order to obtain an economic benefit directly or indirectly.		Any activity in which a person or a group use the public space for leisure purposes.		Any activity in which a person or a group use the public space for religious purposes.	
Sub-category	Work	Trade	Sports and games	Artistic expressions	Rest	
Individual or collective	Advertising or promoting services, waiting, engaging or attracting possible clients.	Selling or buying products (food, handicraft, clothes, etc.)	Skateboarding, soccer, cards, marbles, <i>rayuela</i> .	Playing music, dancing, painting, acrobatics, reciting and singing.	Eating, resting	Processions, praying, lighting candles and putting flowers.

This study uses a technique also known as “activity mapping” that has been developed to analyze the ground-floor in relation to the street uses and physical elements (Francis 1984). This technique is used to understand the “temporal city” that takes place in the urban space. The theoretical aspect of this technique stresses the process of interaction between people and the physical environment.

The observation was realized during the weekdays and weekend as well as at five different times within the day and at periods of one hour each. The activities will be mapped as an expression of the temporary appropriation. The resulting map shows the exact location and time of the temporary appropriation occurring in the public space. The temporary appropriations that shape the urban realm in the local context were researched. The proposed observation was as follows:

2.2.1 *Days of observation*

The days of observation within the week for the two selected streets were 2, Monday and Sunday @ 1 block of 8 in the case of *San Jerónimo St.* and 5 in the case of *Moneda St.* Each block 15 min. walk. In total, 20 days staggered across 2.5 months.

2.2.2 *Time of observations*

From 7.00 – 9.00 am: The first period of observation is selected according to the “rush hour” in the MCC. Offices, shops and schools usually start their operation at this time of the day.

From 2.00 – 4.00 pm: The second period was lunchtime. Many people use to take a break to go out and have lunch, therefore the chances of observe diversity of activities in public spaces are higher.

From 6.00 – 8.00 pm: The third period was when the majority of the people end their activities.

2.2.3 *Observation Technique*

A 3 round observation occupying a 2-hour period was carried out each day. Each two hours consist of 2 rounds of 15 minutes walk (to and from totalling 30 minutes in each hour); i.e., 4 rounds per 2 hour slot. These rounds of observation were conducted in 6 snap shots @ two 15 minutes walk snap-shots per hour per area in a one day observation.

2.2.4 *Diversity Analysis*

The diversity of temporary appropriations was calculated using the Shannon-Weiner diversity index which the formula comes as follows $H' = -\sum p_i \ln p_i$ in which $p_i = 1/S$ (S=total number of elements). Meaning that the higher the value of diversity index, the higher level of temporary appropriations. After calculating the diversity value of each street, the results were compared and show which of the analysed streets have the higher value and therefore higher temporary appropriation.

2.2.5 *The sample, data collection and analysis*

The purpose of the case study was to provide a scenario in which the relationship between urban design interventions and the appropriation of public space can be explored. The MCC is currently in process of urban transformations and the majority of the interventions have taken place in a well-defined area, which is perimeter “A” of the city centre. Therefore it was the perfect time to analyse the spatial configuration changes and their impact on the appropriation of the street. The selection of streets is explained in the following section.

2.2.6 Selected sample of Streets

Even though it is very difficult to compare two different urban areas, two streets that shared similar urban morphology and land use/function are proposed for the two case studies. *Moneda Street* and *San Jerónimo Street* share similar urban conditions listed as follows: 1) both streets are located within the same urban area. They are in Perimeter A of the MCC and they are part of the master plan of urban design interventions orchestrated by the *Autoridad del Centro Histórico* (2016), 2), and both streets function as a link between a boulevard and a square, in the case of *Moneda Street*, *Eje 1 Vidal Alcocer* with *Plaza de la Constitución* and in the case of *San Jerónimo*, *José María Izazaga Av.* with *Plaza de las Vizcaínas* (Figure 8) and 3) Both streets equally are populated (Figure 9) and present a segment that is designated for pedestrian use only (Figure 10)

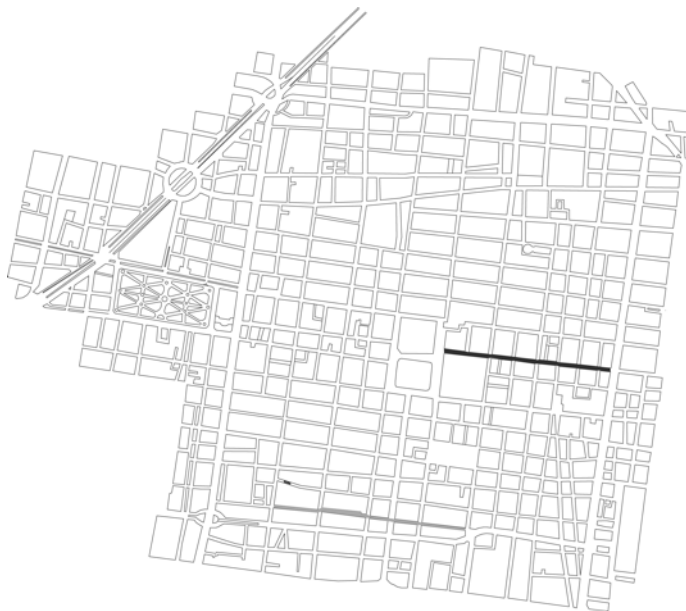


Figure 8 City Mexico City Centre. Areas of Study Source: Autoridad del Centro Histórico

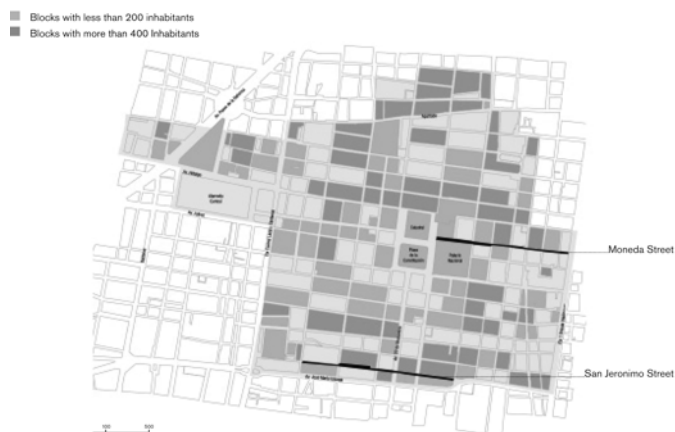


Figure 9 Population living in the MCC. Source: Autoridad del Centro Histórico

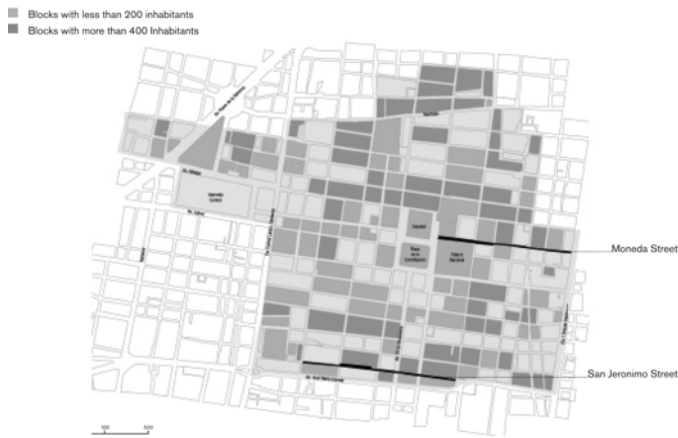


Figure 10 Areas for only pedestrian traffic within the selected streets. Source: Autoridad del Centro Histórico

2.3 Mapping and analysing data

The temporary appropriation and the urban design elements of the spatial configuration were processed in order to produce maps and a database of the two cases. The use of the AutoCAD and ArcView will allow to link polygons on maps of *Moneda* and *San Jerónimo* with the database. The resulting graphics were used for develop layouts for a deep comparison indicator by indicator for each of the two streets. The first layout corresponds to the *photo-by-photo* maps will be built on an average-and standard-deviation basis; the legend will indicate basically tones of three tone of grey colour, one tone of colour indicating the values below the average, other indicating the average value and the other colour indicating the values above the average (Figure 11). The temporary appropriation map was overlapped to each of these maps to understand the correlation with the spatial configuration analysis. The latter allows an effective way to understand the overall characteristics of the two cases and also the identification of the main differences.

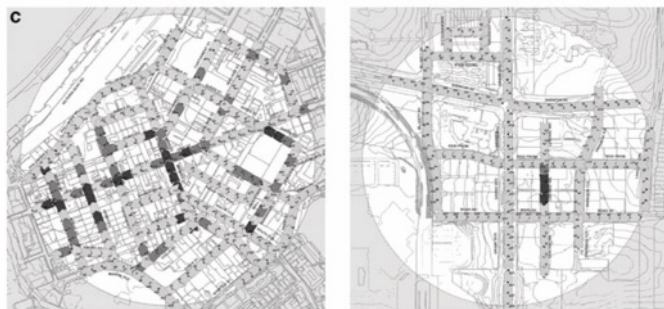


Figure 11. Photo-by-photo analysing *softness* indicator of two streets in Perth, Australia. Temporary appropriation map not included. Source: Porta and Renne (2005)

3 RESULTS

3.1 3.1 Softness and the temporary appropriation

Figure 12 shows an overview of the softness indicator and the temporary appropriation in San Jerónimo St. A total of 388 temporary appropriation activities were observed. From this total number, 232 (59.7%) corresponds to the temporary appropriation by commerce/service, 148 (38.1%) were classified as temporary appropriation by leisure and 8 (2.2%) as temporary appropriation by sacralisation. On the one hand the temporary appropriation by commerce/services is strongly related to high levels of softness. On the other hand the temporary appropriation by leisure does not show any correlation to this urban design element. What is striking is that the temporary appropriation by sacralisation seems to be present where the lower levels of softness are within the whole street.



Figure 12 Softness and temporary appropriation in San Jerónimo St.



Figure 13 Softness and temporary appropriation in Moneda St.

Figure 13 presents the results obtained from the preliminary analysis of softness attribute in Moneda St. A total of 111 temporary appropriation activities were observed. From this total amount, 62 (55.8%) correspond to the temporary appropriation by commerce/service, 148 (44.2%) were classified as temporary appropriation by leisure and no temporary appropriation by sacralisation was observed. The results of the correlational analysis can be compared by two figures. Overall the temporary appropriation in Moneda St. is more than three times lower in comparison with San Jerónimo St. It is apparent from this figure that temporary appropriation in general is less observed in places with low levels of softness. Even though the Moneda St. presents lower levels of softness in general this trend is consistent with San Jerónimo St.

Table 5 illustrates the Shannon-Weiner diversity analysis from both streets. The results, as shown in Table 5, indicate that San Jerónimo St. present a higher number of diversity of temporary appropriation in comparison with Moneda St.

Table 5 Shannon-Weiner Diversity analysis of temporary appropriation.

TA activity	Moneda St.		San Jerónimo			
	#	Pi	Pi*(LN(Pi))	#	Pi	Pi*(LN(Pi))
Selling products	10	0.090	-0.22	82	0.21	-0.33
Selling and preparing food	15	0.135	-0.27	55	0.14	-0.28
Advertising	18	0.162	-0.29	67	0.17	-0.30
Promoting services	19	0.171	-0.30	28	0.07	-0.19
Skateboarding	5	0.045	-0.14	23	0.06	-0.17
Football				10	0.03	-0.09

Playing cards	2	0.018	-0.07	2	0.01	-0.03
<i>Rayuela</i>				3	0.01	-0.04
Marbles				2	0.01	-0.03
Playing music	2	0.018	-0.07	15	0.04	-0.13
Dancing	1	0.009	-0.04	10	0.03	-0.09
Singing	2	0.018	-0.07	20	0.05	-0.15
Painting				2	0.01	-0.03
Acrobatics	2	0.018	-0.07	3	0.01	-0.04
Reciting	1	0.009	-0.04	8	0.02	-0.08
Eating	22	0.198	-0.32	23	0.06	-0.17
Resting	12	0.108	-0.24	27	0.07	-0.19
Praying				4	0.01	-0.05
Lighting Candles				3	0.01	-0.04
Putting flowers				1	0.00	-0.02
	111			388		
		SW Div	2.16		SW Div	2.42

Also there is a surprising new variety of temporary appropriation by commerce or services in Moneda St. First, Figure 14 shows a woman who was selling food hide behind a phone cabin in Moneda St. As soon as a policeman approaches she closes the portable device and pretend just to be waiting something. Another variety of temporary appropriation by commerce/services is shown in Figure 15, which illustrate a man who is using his own wheelchair as a mobile store.



Figure 14 Woman selling food hiding behind phone cabin



Figure 15 Man in wheelchair selling candies.

If we now turn to the temporary appropriation by sacralisation, this type of appropriation was not observed. There is a significant difference between two streets. First the observed number of temporary appropriation is lower in Moneda St. even though the street has been physically improved. A comparison between the two figures reveals that the number of temporary appropriation observed is significantly different. San Jerónimo St. presents higher level and variety of temporary appropriation in relation to the softness indicator. Taken together, these results suggest firstly that there is an association between high levels of softness and temporary appropriation by commerce and services, secondly that there are new types of temporary appropriation at the streets of MCC.

4 DISCUSSION

Legeby (2013) argues that public spaces have an assertive capacity to enable different overlapping uses which is highly relevant for urban design research. If such capacity varies and such deviation could be identified and described the variations in the capacity of places could be established (Legeby 2013). Cities are in a constant process of transformation and the way in which they are designed and re-designed might affect the rationale use of public spaces and its temporary appropriation.

Some scholars (Carmona 2010; Ferguson et al. 2013; Brown & Lombard 2014) argue that the improvement of the physical dimension of the environment through urban design interventions leads to positive effects on social well-being (health, safety, sense of community, etc.). However, urban design interventions that transform the spatial configuration of protected heritage central areas in Latin American cities have led to different outcomes (Carrion 2007). These different outcomes are key to the research gap and needed to be investigated thoroughly. There is a lack of understanding of how the spatial configuration affects the temporary appropriation of public spaces (streets) within this specific context (heritage city centres). The consequences may negatively affect the local cultural expressions which UNESCO declaration is trying to protect and preserve.

An initial objective of the project was to identify urban design elements of the spatial configuration of the street that support the temporary appropriation. Results clearly shows that softness is to some extent an urban design element of the configuration of the street that contributes to the temporary appropriation. The temporary appropriation by commerce/services shows a clear relationship to softness. In general therefore it seems that the higher levels of softness the higher chances of temporary appropriation by commerce/services. Surprisingly other activities as new types of temporary appropriation were found. This was unexpected and suggests that the way in which people temporary appropriate the street in MCC is changing. This finding further support the idea of Crossa (Crossa 2009) who claims that the temporary appropriation by commerce/services will remain in MCC even though the efforts by authorities. Future studies on the current topic are therefore recommended.

5 CONCLUSION

The paper is an initial contribution to codify elements pertaining to urban design such as materials, urban furniture and landscaping while assessing their capability of encouraging an informal use of public space. This type of analysis builds on existing analytical tools, which are typically used to analyse formal indicators and sustainability (Porta & Renne 2005), and sociability and accessibility to the street (Mahdzar 2008). The novelty of this study is to adapt these tools for the purpose of the study which is, mainly, to identify the urban design elements of the spatial configuration of the street that supports the temporary appropriation. This study has identified a relationship between softness as an urban design element and the temporary appropriation in MCC. The second major finding was that there are emerging new types of temporary appropriation that challenge formal prescriptions as counter spaces or space of resistance. In general this findings are suggesting that though aesthetically pleasing for tourist and visitors, the urban design interventions conducted in the MCC in conjunction with changes in the urban landscape (physical and

social) have resulted in the eviction of urban actors, thus eliminating lively social dynamics that they were contributing to (Martinez-Ramirez 2015; Campos Cortés & Brenna Becerril 2015). For instance, before urban design interventions, the public spaces used to be more diverse with different people carrying out distinct activities (domestic workers chatting, indigenous groups gathering, families playing, religious groups predicating, vendors, clowns and mimes entertaining). This diversity of activities in public spaces is the expression of the temporary appropriation. Activity diversification also means more opportunity of temporary appropriation and consequently more inclusiveness; currently those opportunities have instead been decreased in the intervened areas.

Though the current outcome enhances our understanding of the relationship between the temporary appropriation and the urban design in world heritage city centres, and add to a growing body of literature on appropriation within the specific context, the scope of this study was limited in terms of urban design elements. Further research could usefully explore how other elements of the streets spatial configuration. The present research is therefore intended as a first step aimed at establishing a methodology, within the defined theoretical framework, that is potentially extendable to other streets in Mexico City Centre, in order to map extensively the city and develop, in the future, urban tools taking in consideration the appropriation as a fundamental element in the use of the street as public space.

Further the approach can be extended to other Latin American contexts where the understanding of pattern of informal temporary appropriation are pivotal to the improvement of the quality of life in the city.

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