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First published in Nairobi in 2013 by UN-Habitat.
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HS/060/13E

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STREETS AS PUBLIC SPACES: A HISTORICAL PERSPECTIVE
People have histories; streets do too

Towns and cities have historically been organized around their streets. Streets have traditionally served three main purposes: mobility, commerce and social interaction. The street, normally defined as a public space with residential houses, commercial buildings and other structures on one or each side, therefore, has social and economic functions that are integral to urban life.

Indeed, there are multiple functions of streets as links or places that have commercial, economic, civic, ceremonial, political, cultural and social value. However, this multi-functionality is often overlooked, and streets are usually regarded as mere links in a road network, enabling travel between two or more destinations.

The conventional representation of the street as a link has tended to reinforce the linear representation of the street, defined only through its movement function, and ignoring or subverting the other functions. While this definition is a useful simplification for the purposes of understanding the movement of traffic in a network, it omits other significant aspects of the street as a public space.

Streets determine intra-city connections, while inter-road networks determine connectivity between cities. This report focuses on the former, which are considered an essential element of urban form and structure.
PLANNING AND DESIGN OF STREETS AS PUBLIC SPACES IN THE ANCIENT ERA

Streets in ancient cities were the result of a vision of civilization rather than a function of the economy.

The traditional, pre-industrial urban settlement was one with a central meeting place for transactional activities, such as commerce or governance, surrounded by housing, workshops, and neighbourhood services, which is typical of the monocentric cities, with the wealthiest and most influential inhabitants living closest to the centre. Streets radiated from the nucleus of the city, which was usually the seat of political power or place of worship, such as a mosque, a temple or a cathedral, or some other structure of political, commercial or cultural significance, such as a royal palace or suq (covered market street that is characteristic of Arab cities). Main streets in trading coastal cities often constituted the “communication spine” of the city, often linking harbours to markets and other trading centres. Streets thus formed an integral part of the social and commercial fabric of these settlements. They shaped the urban form and structure by separating blocks and linking different places of interest within the city.

In this sense the way streets were planned, designed and connected were of importance. The grid pattern, which is a type of street plan in which streets run at right angles to each other (thereby forming a grid), is characteristic of many ancient cities. The grid system was commonly used in settlements of the Indus Valley that date back to 2600 BC. A typical city of the Indus Valley Civilization was composed of two sections connected via large streets of about 30 meters of width intersecting at right angles: one located on an artificially raised mound and another at ground level.1 Houses were located at the lower level while other buildings of the city, such as assembly halls and religious structures, were located at the elevated level. The layout of the grid system promoted social interactions and commercial exchanges that made streets play their full function as public spaces. In addition, it facilitated the provision of basic services. For instance, water, sanitation and sewerage systems existed in the Indus Valley Civilization.2

In the Egyptian city of Giza, workers’ villages were laid out in blocks of long galleries separated by streets in a formal grid. In 1700 BC, Babylon, one of the greatest cities of antiquity, was rebuilt along wide and straight streets in a grid pattern. The street grid plan has also been noted in China since 1500 BC, where guidelines outlined that a “capital city should be square on plan” and that the design of streets should consider three gates on each side of the perimeter leading into the nine main streets of the city. As fundamental component of public space, the street network links other public spaces to public as well as private spaces. For instance, the Chinese grid-pattern was shaped along four main directions, linking other important enclosed public spaces such as the Royal Court situated in the south, the marketplace in the north, the Imperial Ancestral Temple in the east and the Altar to the Gods of Land and Grain in the west.3 Teotihuacan, near present-day Mexico City, seems to be the largest ancient grid-plan site in the Americas. The city’s grid covered 13 square kilometers. Its geographical layout is a typical example of the Mesoamerican tradition of planning cities with its urban grid aligned to precisely 15.5° east of north.3

The grid pattern was also adopted by the Greek and Roman empires. Although the grid was an idea present in ancient city planning, it slowly gained primacy from the 5th century BC with the planning of many Greek cities.4 The grid system eased the movement of military units and commerce from one Greek city to another. It was adopted and designed for efficiency and inter-changeability, both facilitated by and aiding the expansion of the empires, particularly in Europe. The Roman grid was designed in a way that street intersections would be sited along important public buildings, in much the same way as central business districts are located in the centre of modern day metropolitan areas.5 With the expansion of the Roman Empire, the concept of a grid pattern became a common feature of town planning in many cities of Europe and North America until the 20th century.6

The grid was also seen as a tool to democratize the distribution of land and define the boundaries between public and private ownership. Streets as public spaces were not legally protected as were most commons in public domains.7
The people of the Indus Valley Civilization, which dates back to 2600 BC, achieved some spectacular feats when it came to building cities. Each city was carefully planned and at the peak of the civilization housed almost 40,000 people.

A typical city would be divided into two sections, each fortified separately. One section, known as the acropolis, was located on an artificially raised mound while the other was on ground level. The acropolis contained the important buildings of the city, such as the assembly halls, religious structures, granaries and, in the case of Mohenjo-Daro (in present-day Pakistan), the famous Great Bath. The lower section of the city was where the housing for the inhabitants was located.

The city was well-connected with broad roads which intersected at right angles. In Mahenjo-Daro, classification of streets was practiced, with secondary streets being about half the width of the main streets and smaller streets being about a third to a quarter of the width of the main streets. The houses, built with standardized baked bricks were located in the rectangular squares formed by the street grids. What is noteworthy is that almost every house had its own wells, drains and bathrooms. Each house was connected directly to an excellent underground sewer system that ran throughout the city. The inhabitants of the cities of the Indus Valley Civilization enjoyed a degree of sophistication unknown in the ancient world, not only in terms of sanitary conveniences, but also in terms of a highly developed municipal life. What is absolutely astounding is that these cities existed close to five thousand years ago.

**Source:** Projects by Students for Students (undated); Kenoyer (undated)
ATHENS – HISTORICAL, CULTURAL STREET SYSTEM

Athens, one of the oldest cities in the world, has undergone various transformations through more than 7,000 years of existence. Situated in southern Europe, Athens became the leading city of Ancient Greece in the first millennium BC and its cultural achievements during the 5th century BC laid the foundations of western civilization.

In 1832, Athens became the capital of Greece with a population of about 10,000 inhabitants. The city had a few ruins and historical monuments with a few dwellings at the foot of the Acropolis. The first plan for the new capital was drafted and submitted in December 1832, and on June 29 1833 it was approved. However, after a series of protests, the implementation of the plan was suspended until a final revision was done in 1836.

The street network was elaborated in part as spokes with hubs at circular plazas, and in part as horizontals and verticals in the direction of the main axes, always with absolute regularity. The shape of the main axes would be an isosceles triangle, with its peak at today’s Omonia Square, its sides defined by Piraeus and Stadiou streets, and Ermou Street as its base. The Royal Palace was expected to stand at the peak of the triangle: a symbolic merger of the geometric apex and the apex of state power. The broader area of the Royal Palace was surrounded by wide avenues. The orientation of the sides of the triangle was not accidental. As Kleanthis and Schaubert note in their memorandum, “they meet in such a manner that allows viewing simultaneously the comely Lykavitos, the Panathenaic Stadium, the rich-in-proud-memories Akropolis, and the military and commercial ships of Piraeus, from the balcony of the Royal Palace”. The plan was designed to host all of the activities of a capital and a population which was expected to reach around 40,000. The geometric planning that runs through both the Kleanthis-Schaubert plan and the Klenze plan is a basic constitutive element of neoclassical-romantic city planning connected with the notions of Nation, Law, State and Government, as they were current during the course of the 18th Century.

The people’s reaction and negotiation

Just as the lines were being laid down and it became physically clear what areas would be expropriated for the erection of public buildings, the development of the parks and the roadway network, as well as the archeological excavations, a wave of protests erupted from property-owners, along with charges of profiteering.

The plans for expanding Athens were therefore delayed till 1840, when the first Athens theatre began to operate. It was located, according to an eyewitness account, “outside of the City … in the naked plain surrounded by mountains”. This “outside the City” locale is today the small square between Menandrou and Socrates streets, behind the Vegetable Market, in the noisy center of the city, where its memory survives as Theatre Street.

Source: Kallivretakis, (undated); GrigorisSokratis, 2008
The Roman city of Barcelona in modern-day Spain was founded around 230 BC. Barcelona had the form of a castrum (plots of land reserved or constructed for use as a military defensive position), with the usual perpendicular main streets of the Cardus Maximus (north to south oriented streets) and the Decumanus Maximus (east to west oriented road) and a central public square located on the Táber hill, site of the iberic Barkeno. The city had perimeter walls which were 1.5 km long, enclosing an area of 12 hectares.

Barcelona’s regular grid was commissioned in 1874 as a way to sanitize the city, then still constrained within its medieval walls. The city plan consisted of regular streets that followed the direction of the sea and connected the existing city (now the Old City), with the surrounding villages.

The plan also defined a hierarchy of infrastructure. At its heart was the hospital and, two parks and, at street junctions, the "ochaves", chamfered blocks for commerce. The city was highly compact and displayed complex street forms with low dispersion of varied street network types with medieval streets ending in broad, bustling boulevards.

Two main streets play a significant role: Passeig Gracia and Rambla Catalunya; the former displays the most elegant and significant shops and institutions of the city, while the latter is a popular commercial street that continues to the sea after crossing Placa Catalunya. All the streets, except Diagonal and Gran Via, maintain single-traffic directions.

Source: Mora, 2003


Source: Museu d’Història de la Ciutat, Barcelona.
CHAPTER 1: STREETS AS PUBLIC SPACES: A HISTORICAL PERSPECTIVE

City a unique image compared to cities such as New York, where the grid street system is the norm. The large boulevards of Paris are a result of its history of urban transformation. From 1852 to 1871, buildings were demolished to accommodate the construction of wide boulevards through the fabric of old Paris and to clear space around historic buildings, such as the famous Notre Dame and the Palais du Louvre. This was meant not only to promote unimpeded movement, but also to make the construction of barricades impossible.

In the Netherlands, canal rings are amongst the most prominent feature of Amsterdam’s architecture. These concentric rings of canals, built during the 17th century, have since been an icon of urban planning and architecture. The street system of Helsinki in Finland is shaped by a plan where straight and wide streets are placed on a geometric grid. In the United States, many cities did not start with a grid system. However, many North American cities adopted the grid system later as it facilitated the rapid sub-division and auction of large parcels of land. The grid system was also seen as a safeguard against overcrowding, fire, and disease. One of the first cities to use the grid system in the United States was Philadelphia, in 1682. However, one of the most perfect grid systems in the world is to be found in Manhattan, the heart of the city of New York. The grid system of Manhattan was planned and designed in 1811 and was chosen for its practicality, easy-to-implement nature, and its facilitation of real estate development. A museum curator in New York described Manhattan’s grid system thus: “City cultures are defined by their plans. Los Angeles is subdivisions, Paris is broad boulevards, Vienna is the Ringstrasse, and New York is the grid. The grid has shaped this vibrant city, imposing an order and controlling its chaos.”
In 1810, the population of New York City, which was about 96,000, resided in homes near Manhattan’s southern tip crossed by a winding dirt route known as the Boston Post Road, which was further divided into large green estates similar to rural areas. Before the creation of the master plan in 1811, street construction on Manhattan on a grid-like design was approved by the city’s Common Council on an ad hoc basis. However due to an increase in population, a formal master plan similar to the ad hoc plan was approved in the same year; it was based on a grid system full of streets and wide avenues placed at right angles, different from the design of cities such as Washington, D.C., or capital cities in Europe. Manhattan’s 200-year old grid system has served the population of New York well, and continues to inspire urban planners and architects around the world. With several extensions over the years, the grid today adequately caters for the needs of the city’s 1.6 million residents; the 1.6 million commuters who come from other boroughs every day; the 19.6 million visitors from the New York metropolitan area and the over 50 million visitors from around the world annually.

Although the grid has received its share of criticism, citing it as a monotonous plan which creates orderliness and one whose design did not appreciate natural features; it has formed a working street network for a large city, and is hailed as a major milestone in the history of city planning. In addition to its forming the foundation of the urban form of present day Manhattan, some analysts identify the street layout as a good plan whose short blocks provide continuous diversity for pedestrians, making the city walkable and vibrant.

Source: Ballon, 2012; Jaffe, 2011; Marcuse, 1987; New York City Government, Moss and Qing, 2012
Urban growth and expansion since the Industrial Revolution

The monocentric form of street design and planning that characterized many cities in the pre-industrial era started to change in the 18th century and at the start of the Industrial Revolution in the 19th century, which saw street designs in Europe and North America becoming more polycentric and hierarchical, partly as a result of stratification of society along class lines. The Industrial Revolution led to massive rural-to-urban migration as migrant workers sought jobs in factories. While industrial cities tended to grow around a single focal point, such as a factory, it was the low-paid factory workers that tended to live closest to the centre amid the factory-generated pollution and squalor. Better-off people, with more secure jobs, higher incomes, and shorter working hours, tended to move to lower-density areas towards the edge of these cities – a process that accelerated with improvements in passenger transport, especially with the advent of the automobile. Suburbs – so named because these areas were situated beyond the main urban core and lacked employment opportunities and urban facilities, such as high-level services – dominated the physical growth of cities throughout most of the 20th century.

Rapid urban land expansion had a major impact on streets and inter-road networks. Changes in urban growth patterns were accompanied by changes in street patterns.

With high natural growth rates and increased rural-urban migration flows, urban growth rates were noticeable. Until the mid-19th century, both the United States and Canada were mainly rural, with less than 20 per cent of their respective populations living in urban areas (15 per cent and 13 per cent in 1850, respectively). Rapid population growth also led to higher urbanization levels, which more than doubled at the start of the 19th century (40 per cent and 37 per cent, respectively). This rapid urban growth was particularly noticeable in large cities, such as New York and Los Angeles. For instance, the population of Manhattan, estimated to be 61,000 in 1800, reached 1.9 million in 1900. Twenty years later, both Canada and the United States became urbanized, with half of their respective populations living in urban centres. In the mid-19th century, a large majority of their populations (6 out of 10 inhabitants) were urban residents. At the start of the 21st century, 8 out of 10 inhabitants in North America lived in urban areas, a situation that has remained constant in the last decade. Australia and New Zealand also experienced similar urbanization processes, but at a more rapid pace. In 1950, three-quarters of their respective populations were already living in urban areas, which is more than the urbanization levels observed in North America during the same period. In 2010, 9 out of 10 people in both countries lived in urban areas.

Similar trends have been observed in Europe, with some variants between Western and Northern Europe and Southern and Eastern Europe. As observed in North America, Western and Northern Europe experienced rapid urban growth due to a combined effect of increased natural growth rate and rapid urbanization during the 19th century. However, prior to industrialization, the European population experienced population decline due to diseases, particularly in the 8th century. During the European agricultural and industrial revolutions, however, the life expectancy of children increased significantly and Europe’s population increased from about 100 million in 1700 to more than 400 million in 1900. The natural growth rate remained high in all European countries, but was more pronounced in urban centres where there was better access to health services. In addition to high natural growth rates, rural-to-urban migration contributed to rapid urbanization, with large cities attracting more people. By the mid-19th century, Europe became an urbanized continent with 51.3 per cent of its population living in urban areas out of a total population of 547 million. However, it is important to note that urbanization rates in Western Europe and Northern Europe were much higher than those in Southern and Eastern Europe. In 1950, only 45 per cent and 39 per cent of the populations of Southern and Eastern Europe lived in urban areas, respectively. By the 1970s, however, both regions had become predominantly urban.
FIGURE 1.1 POPULATION GROWTH AND URBANIZATION IN EUROPE, NORTH AMERICA AND OCEANIA, 19TH-21ST CENTURY

PROPORTION OF URBAN POPULATION, CANADA, 1851 - 1931

1851 1861 1871 1881 1891 1901 1911 1921 1931

PROPORTION OF URBAN POPULATION, UNITED STATES, 1850 - 1930

1850 1860 1870 1880 1890 1900 1910 1920 1930

PERCENTAGE OF PEOPLE LIVING IN URBAN AND RURAL AREAS, NEW ZEALAND, 1886-2001


LEVEL OF URBANIZATION (%), 1950 - 2010

EUROPE, NORTH AMERICA, OCEANIA

Source: http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demod2a-eng.htm Access in 2013


Rapidly increasing urbanization levels from the 19th to the 21st centuries have been accompanied by spectacular growth in city size. While most cities in the pre-industrial age had less than 100,000 inhabitants, the population of cities in the 20th and 21st centuries began reaching the one million mark, and by the end of the 20th century some cities were hosting tens of millions of inhabitants. Some cities have been classified as megacities with 10 million or more of inhabitants. In 1810, Manhattan, the heart of New York City, had a population of less than 100,000; the urban agglomeration of New York-New Jersey today hosts more than 20 million people. Cities planned in the 19th century, such as Athens, held less than 100,000 inhabitants but today have populations exceeding 3 million. At the start of the 19th century, none of the European cities hosted 1 million or more inhabitants. The city with the largest population was London (861,000), followed by Paris (547,000). The population of Amsterdam was estimated to be 209,000. Moscow's population was 146,000 and Saint Petersburg's was 164,000. It was only 20 years later that London's population reached the 1 million mark (1.3 million in 1825), followed by Paris 25 years later (1.3 million in 1850). Throughout the 19th and the 20th centuries, both cities grew spectacularly and entered the 21st century as mega cities. In 2010, the Population of Paris and London was estimated at 10.5 million and 8.9 million, respectively.

During the period of rapid urban growth in the 19th and 20th centuries, urban population growth in Europe and North America mostly occurred on the edges of cities. This was followed by rapid urban land expansion that led to a horizontal spreading of settlements with high fragmentation or dispersion of houses and other buildings.23 This expansion occurred in different ways across regions and produced different forms of cities. In the early 1900s, in most cities urban expansion occurred just at the edge of cities. However, with the development of the automobile, the expansion extended beyond the edges of cities and generated the formation of new satellite cities.24 In the United States, this form of urban expansion, known as urban sprawl, led to the uncontrolled expansion of low-density, single-use suburban development, with spacious houses, schools and shopping malls creating self-contained neighbourhoods that serviced high- or middle-income groups.25

In Europe, urban land expansion was also accompanied by urban population growth, but to a lesser extent compared to the North American urban sprawl model. In most European cities, urban land expansion was associated with the fact that the centre of the city was also the most expensive, and unaffordable to poor urban dwellers who had to move to the outskirts of the cities, a trend that was similar to American urban expansion during the pre-industrial era. Unlike urban sprawl in the United States, sprawl in Europe created suburbs primarily inhabited by lower-income groups, many of which constituted immigrants.

However, the face of urban expansion has recently changed in Europe in the last few decades with a continuous decrease of urban population density.26 Most Canadian cities have also undergone a transition towards an increasingly decentralized urban form, particularly observed during the period 1971-96. These trends, however, are quite diverse, pointing to fundamental differences in the respective importance of growth in central and outer parts of metropolitan areas.27 In Australia and New Zealand the same trend of urban land expansion accompanied by low density settlements has been observed in Auckland, Melbourne and Sidney.
FIGURE 1.2  CITY POPULATION TRENDS IN SELECTED CITIES 1800 -2010

CITIES’ POPULATION SIZE, 1700 - 1950, EUROPE


POPULATION SIZE OF AUCKLAND AND OTHER CITIES OF NEW ZEALAND (1886-2001)

Source: New Zealand 1886-2001 Censuses of Population and Dwellings

LARGEST CITIES IN THE UNITED STATES, 1850 - 1950

Source: http://en.wikipedia.org/wiki/Largest_cities_in_the_United_States_by_population_by_decade Access in 2013
From monocentric and grid to polycentric and hierarchical street planning

Urban expansion led to de-concentration and reduced population densities. Increased use of the automobile and the streetcar allowed people to commute to their places of work. Whereas the wealthy in the 19th century might have preferred to live in the city centre, as the poor were forced to walk from the outskirts, the modern well-to-do are less constrained by transport times and, therefore, occupy land in less-dense suburban and exurban cities. This has resulted in new forms of urbanization, such as mega-regions, urban corridors and city-regions. Thus the monocentric form of cities has been progressively substituted by polycentric forms with various centres of interest.

In some cases, urban expansion has created suburban areas that substitute the functions of the inner core of the city by offering a full range of services that traditionally belonged to compact cities, thereby creating polycentric cities, as observed in the American urban sprawl model. While urban density is lower in these new settlements than in the main city core, there are now many city centres with different poles of interests. Rapid urban land expansion had a major impact on streets and inter-road networks. Changes in urban growth patterns were accompanied by changes in street patterns.

The transition from monocentric cities to polycentric cities is also associated with changes in street patterns from the grid system to other types of street patterns, particularly hierarchical systems. Hierarchical street plans (those that assign different levels of importance and functions to different streets) became more prevalent as cities became more polycentric. The changes in the occupation of space were accompanied by changes in urban form and structure. Grid pattern city planning gave way to hierarchical planning.

The shift to hierarchical street patterns in most cities of the developed world has been associated with the more prominent role of the automobile in the 20th century that allowed people to easily commute longer distances. Though the emergence of the automobile during the 1920s had a positive impact on mobility, it also had negative consequences, among them an increase in the rate of car accidents, particularly among small children. It has been reported that, at the early stages of the automobile’s entry into major cities, the fatality rate from accidents doubled.
The increase in deaths associated with road accidents called for a revision of the street network system that discouraged traffic to residential areas. This called for a distinction between residential streets and other types of streets. A systematic shift in planning of cities favoured the hierarchical system. In cities where population growth was associated with high urban land expansion, the street design of new settlements was through a hierarchical system of streets.

The changes in the occupation of space were accompanied by changes in urban form and structure. **Grid pattern city planning gave way to hierarchical planning.**

In the United States, official guidelines were revised to reflect this hierarchical system that made a clear distinction between **residential streets** (those with no or less through traffic), **arterial streets** (those that provide direct, relatively high speed service for longer trips and large traffic volumes) and **collector streets** (those that link cities to arterials, as well as collect traffic from local roads).34/35 During the same period, the Great Depression that began in 1929 forced the US government to change its housing policy. The functions of city planning and design were increasingly taken away from the public sector and allocated to the private sector. The Federal Housing Administration (FHA), created in 1934, would only finance houses in suburbs that met approved standards in a guide called Standards for the Insurance of Mortgages on Properties Located in Undeveloped Subdivisions, which did not give consideration to connectivity.36 The only consideration was the topology of the areas and respect for a hierarchical system of streets. It discouraged designs that would facilitate through traffic and gave preference to cul-de-sacs. Indeed, the curvilinear street system accommodated the market for housing created by the monetary and regulatory influence of the FHA and the reduction in government controlled master planning. The design reduced through traffic, thus providing the privacy sought by families leaving the cities, and cul-de-sacs were seen by both the government and the public as the safest environment for raising children.37

However, while this hierarchical street network may have reduced the number of accidents, it has increased traffic congestion. For instance, the American Society of Civil Engineers (ASCE) found that street networks that are based on the cul-de-sac design increase travel demand on arterial streets by 75 per cent and on collector streets by 80 per cent, compared to a 43 per cent lower vehicle miles travelled (VMT) with a grid street design.38 The ASCE study also found that the connected network, in the contrast to the cul-de-sac, reduced travel times and speeds, factors that impact street safety.

### AFRICA, ASIA, LATIN AMERICA AND THE CARIBBEAN

In Africa, Asia and Latin American and the Caribbean, streets have also played a determining role in the cultural, social, economic and political functions of cities. This has been observed since the ancient era, in the Indus Valley civilization that dates back to 2600 BC, to the city of Babylon, the Egyptian city of Giza, to China and to the Americas in the city of Teotihuacan, near present-day Mexico City.

In the 7th century, the Japanese and Korean societies adopted Chinese grid-planning principles in numerous settlements. However, except some part of Tokyo, the street network surrounding the Edo Castle grounds was irregular for reasons of defense. Although the grid system was predominant in most ancient cities, it was not systematically adopted in all cities. For instance, in Constantinople (present-day Istanbul), it was not easy to classify street patterns despite various studies having been undertaken. Indeed this Byzantine settlement adopted different street patterns. Similarly, the historic city of Cairo, built between the 7th and 10th century after the Arab conquest, adopted an organic pattern of streets with a large number of dead-end streets.39 The city of Addis Ababa, founded in 1886, also did not adopt any particular type of street system; it was literally a city without regular street patterns. Only with the final decision to halt the movement of the imperial court connecting bridges and streets were laid-out in an organic manner along the undulating terrain. With the further growth of the city the dots of the first camps were connected and a network of streets was formed. One of Emperor Menelik’s contributions that is still visible today is the planting of numerous eucalyptus trees along the city’s streets.

As noted in the first section of this chapter, though the grid was an idea present in ancient city planning, it slowly gained primacy from the 5th century BC with the planning of many Greek cities. The planning of European cities in the 18th and 19th centuries, which was highly influenced by the Roman grid pattern, was also extended to Africa, Asia and the Americas during the colonization period.

Cities in colonial Africa adopted the grid system, despite resistance from indigenous populations. For instance, before the advent of French colonialists, Dakar in Senegal constituted villages organized around mosques in a circular pattern around an open central space, reflecting the influence of Islam on local spatial organization.40 However, the arrival of French troops in the 19th century changed the face of Dakar. In 1857, the French took control of the Senegal coast, and Dakar was established as an urban district. By 1891, Dakar already had 18,000 inhabitants. The great construction works at the Dakar harbour and public buildings were completed during the 1898-1914 period, and Dakar became the capital of the French Western Africa federation.41 During the same period, the French imposed a city plan on Dakar that reflected the city plan of Paris, with large boulevards and avenues. Reflecting
the military-led development of the city, these boulevards were designed perpendicular to a military fort in order to ease colonial troops’ access throughout Dakar. Similarly, the walls around the old historic city of Mogadishu in Somalia were pulled down in 1920 when the Italian rulers embarked on a programme to make the city the political and administrative capital of Italian Somaliland, with wide boulevards, modern government buildings and scenic waterfronts.

In response to resistance from the indigenous inhabitants, the French rulers adopted a dual assimilationist/associationist approach in Dakar that allowed indigenous residents to organize their settlements at the edge of the city. They decided to create districts that were exclusively for Europeans and others that were for the local Africans. Expelled from the centre, the indigenous people were left to their own devices in overcrowded areas where streets were irregular and unserved, with no adequate sewerage and drainage systems. This marked the beginning of the segregation of distribution of basic services through urban planning in Dakar and other West African cities. Construction with temporary building materials was authorized in the indigenous settlements, but “the inhabitant only obtained a property title when built out of permanent materials”. Rather quickly, in the 1950s, the authorities were overwhelmed by the arrival of new migrants, and many shantytowns appeared on the non-developed urban fringes. It was at that time that a new policy of massive exodus of the “illegals” toward the periphery began. This kind of urban divide was also a hallmark of British colonialism in Africa, when in the early part of the 20th century cities such as Nairobi and Harare were planned along racial lines, with the local Africans being relegated to the least serviced parts of the city, while the Europeans laid claim on the planned parts of the city that enjoyed superior services and better infrastructure.

Map 1: The displacement of the lebu residential quarters from the city centre of colonial dakar by the 1910s. Source: Bigon, 2012
Map 2: Dakar’s French Influenced Boulevards. Source: Image © 2013 DigitalGlobe
A number of restrictions governed the city's spatial expansions of Cairo through time. The northern part is less connected although there are two main gates on that wall. On the eastern part, the walled city is completely segregated due to the existing of Al Azhar park and a huge cemetery (in literature it is called the ‘dead city’), in addition to Al Mouqatum Hill which forced the city to expand mainly toward the river Nile. El Muiz Street is the main accessible street inside historic Cairo and it connects the walled city directly through the northern gates and by a number of horizontal routes with the surrounding urban patterns. At the difference of Cairo, during the period 1805 – 1849, the city of Alexandria gained its current European Grid-iron pattern. The type of urban fabric inside the walled city is an orthogonal pattern at the opposite of Cairo with its organic pattern.

**Description**

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<tr>
<th>Description</th>
<th>Cairo</th>
<th>Damascus</th>
<th>Alexandria</th>
<th>Tripoli (Lebanon)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of Foundation</td>
<td>640 AD (Al Fustat City)</td>
<td>Origin dated back prior to 1200 BC, Aramean nomads</td>
<td>Origin dated back to the Pharaonic era</td>
<td>Origin dated back to early Christian times</td>
</tr>
<tr>
<td></td>
<td>750 AD (Al Askar)</td>
<td>In 64 BC became major cities in Roman Empire, the city gained its walls and iron-grid spatial configuration</td>
<td>332-331 BC (Foundation)</td>
<td>1289 Mamluk Sultan Al-Mansur Qalawun abandoning the old city known as Al-Mina and built a new city, which is the origin of the present town.</td>
</tr>
<tr>
<td></td>
<td>870 AD (Al Qata‘i)</td>
<td></td>
<td>1805 – 1849 AD the city gained its current European Grid-iron pattern</td>
<td></td>
</tr>
<tr>
<td></td>
<td>969 AD (Fatimid Cairo)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of urban fabric inside walled city</td>
<td>Organic pattern-high number of dead-end streets</td>
<td>Based on a grid-iron old configuration. Current pattern is partially organic pattern</td>
<td>Orthogonal pattern</td>
<td>The old fabric is Organic pattern</td>
</tr>
<tr>
<td>Level of integration with surrounding context</td>
<td>Highly integrated with the western side of the historic Cairo</td>
<td>Highly integrated with the western side of the historic Damascus</td>
<td>Less integrated with the south part of the formal wall's path</td>
<td>Old Tripoli is highly integrated with the western side of the city</td>
</tr>
</tbody>
</table>

**Source:** Mohareb, and Kronenburgarab, 2012
CHAPTER 1: STREETS AS PUBLIC SPACES: A HISTORICAL PERSPECTIVE

Mogadishu has a long history that dates back to the 10th century when Arab and Persian traders began settling there. The city has at different stages of its history been a sultanate, a city-state, an important sea trade hub, the capital of a colonial administration and of an independent nation-state. Historical records indicate that the city was a traditional centre for Islam; Mogadishu’s mosques are known to be among the oldest in sub-Saharan Africa. When the Moroccan traveller Ibn Batuta visited Mogadishu in 1331, he described it as “an exceedingly large city” where rich merchants sold the finest cloth, silver and gold, and where camels were traded and slaughtered.

Like many historical coastal East African cities, Mogadishu’s architecture and street planning reflected what is known as the “Swahili culture” of East Africa that has strong Arab and Persian influences mixed with local African traditions. Close-knit stone and coral multi-storeyed houses facing the sea were built along narrow lanes. These so-called “stone towns” were carefully designed to allow extended families of several generations to occupy several floors of the same building while retaining some level of privacy. The narrow streets were mainly meant for pedestrian traffic. Later, in the 18th and 19 centuries, Mogadishu’s architecture was influenced by its Omani rulers, who later sold the city to Italy in 1905.

The Italians pulled down the wall around the historic city in 1920 and expanded it to build a modern city, complete with boulevards, majestic arches and cathedrals. In 1929, the first masterplan for Mogadishu was developed to establish it as the political and administrative capital of Italian Somaliland. The city remained the seat of government when Somalia attained independence in 1960.

In the last two decades, however, Mogadishu has been the site of much death and destruction brought about by the civil war that started in 1991. Unfortunately, the grandeur and beauty of Mogadishu was lost during the 20 years of civil war and anarchy that reduced many of the important landmarks of the city to bullet-ridden ruins. However, with the establishment of a new government in 2012, it is hoped that Mogadishu – once known as the “White Pearl of the Indian Ocean” – will regain some of its former glory.

**Sources:** Warah, Dirios and Osman, 2012
Urbanization, peripherization of urban growth and expansion

Independence in African, Asian and Latin America and the Caribbean countries led to massive rural-to-urban migration as migrant workers sought jobs in capital cities. In the early 1950s, the city authorities of Dakar in Senegal were overwhelmed by the arrival of new migrants, and many shantytowns appeared on the non-developed urban fringes.

Suburbs – so named because these areas were situated beyond the main urban core and lacked employment opportunities and urban facilities, such as high-level services – dominated the physical growth of cities in these regions throughout most of the 20th century and continues into the 21st century. The monocentric form of street design and planning that characterized many cities in the colonial era started to change in the 20th century and accelerated with the independence of countries from the 1950s onwards. Street designs became more irregular following the peripherization of urban growth, which saw poor families move to the outskirts to areas that lacked basic services. The proliferation of urban settlements that lacked improved water, adequate sanitation, durable housing and sufficient living area contributed to slum growth.48

While the large majority of the people in Latin American and the Caribbean already live in urban areas (79 per cent in 2010), in Asia and Africa only 44 per cent and 39 per cent live in urban areas, respectively. However, with rapid urban growth, it is projected that the majority of Asian and African populations will reside in cities and towns by 2020 and 2035, respectively.

It is important to note differentials in urbanization within the same region. For instance, while in Southern Africa and Northern Africa the majority of the population has already been living in urban areas for the last 20 years and 8 years, respectively, in Western Africa and Eastern Africa, with urbanization levels of 45 per cent and 24 per cent in 2010, respectively, the majority of the population will live in urban areas in 2020 and 2050, respectively. Pronounced variations have also been observed in the Asian region where the majority of the population in Western Asia has lived in urban areas since 1980 while in Eastern and South-Eastern Asia this happened only in 2013, while in South-Central Asia, with an urbanization level of 32 per cent in 2010, it is projected that the majority its population will live in urban areas by 2040.49
CHAPTER 1: STREETS AS PUBLIC SPACES: A HISTORICAL PERSPECTIVE

FIGURE 1.3 URBANIZATION IN AFRICA, ASIA AND LATIN AMERICA AND THE CARIBBEAN, 1950 - 2010

LEVEL OF URBANIZATION (%), 1950 - 2020
AFRICA, ASIA, LATIN AMERICA AND THE CARIBBEAN


Rapidly increasing urbanization levels from the 20th to the 21st century have been accompanied by spectacular growth in city size. While most cities analyzed here had less than 100,000 inhabitants in the 20th century, their populations in the 21st centuries began reaching the one million mark, and by the end of the 20th century some cities were megacities with more than 10 million inhabitants. Similar trends have been observed in cities which were planned in the 20th century. With a population of 36,000 in 1950, Brasilia today has a population of 3.7 million. During the same period, the populations of Chandigarh, Abuja and Dakar increased from 40,000 to 1 million, 19,000 to 2 million, and 200,000 to 2.9 million, respectively.50
FIGURE 1.4 CITY POPULATION TRENDS AND DENSITY IN SELECTED CITIES 1950-2010

CITIES WITH A POPULATION SIZE MORE THAN 10 MILLION IN 2010, AFRICA, ASIA, LATIN AMERICA AND THE CARIBBEAN, 1950 - 2010

CITIES WITH A POPULATION SIZE OF LESS THAN LESS THAN 5 MILLION IN 2010, AFRICA, ASIA, LATIN AMERICA AND THE CARIBBEAN, 1950 - 2010

Peripherization of urban growth - proliferation of irregular, narrow streets

In many cities of the developing world, urban expansion has taken the form of “peripherization” that is characterized by large peri-urban areas with informal or illegal patterns of land use, combined with a lack of infrastructure, public facilities and basic services, and often accompanied by a lack of both public transport and adequate access roads. Here, urban expansion is the consequence of poverty, not affluence, as informal unplanned settlements on the periphery spring up in response to a lack of affordable housing options within the city itself. In these cases, urban expansion results from a lack of policy attention to current urban challenges (slums, land, services, transport, etc.), and more particularly, an inability to anticipate urban growth, including through provision of land for the urban poor. Denial of permanent land rights to the urban poor is one of the main factors behind the “peripherization” associated with urban expansion in developing countries.51

Peripherization of urban growth is synonymous with slum growth in most cities in Africa, Asia and Latin America and the Caribbean. Slums are characterized by the absence of basic services, such as improved drinking water and adequate sanitation, along with insecure tenure, non-durable housing and overcrowding. One out of every three people living in cities of the developing world lives in a slum. UN-Habitat estimates indicate that (in 2012) slum prevalence – or the proportion of people living in slum conditions in urban areas – was highest in sub-Saharan Africa (62 per cent). In Asia, slum prevalence varies from a high of 35 per cent in Southern Asia to a low of 25 per cent in Western Asia, compared to 24 per cent in Latin America and the Caribbean. The lowest slum prevalence is observed in North Africa, with a level of 13 per cent.

The streets in the suburban areas of cities in the developing world often resemble slum areas, with irregular street patterns with multiple unplanned dead-end roads. These dead-ends are not the result of city planning but the result of the addition of plots by land owners who subdivide land in search of profits. In this situation, it is common to find a street ending where a subdivision starts. The result is a high frequency of dead-ends that are quite different from the planned street dead-ends (cul-de-sacs) observed in cities of the developed world in that they are not planned and continue to sprawl. In developing regions, street planning has taken on a hybrid or irregular nature, resulting in haphazard urban development.

Many cities in developing regions are also adopting hierarchical streets in planned parts of the city, following a trend that has been emerging in the developed world since the second half of the 20th century.

Urbanization in the 19th and 20th centuries was thus not only accompanied by rapid urban expansion and increased use of the automobile, but also changes in the design and use of streets and the ways cities were planned. In the next chapter, we examine how street design and planning can contribute to the prosperity of cities.

MAP 1.3: PROLIFERATION OF IRREGULAR, NARROW STREETS AND UNPLANNED DEAD ENDS

Bangui, Central African Republic.
Source: Image © 2013 DigitalGlobe
FIGURE 1.5  PROPORTION OF URBAN POPULATION LIVING IN SLUM AREAS, 2000 - 2012

PROPORTION OF URBAN POPULATION LIVING IN SLUMS, 2000 AND 2012 (PERCENTAGE)

- Sub-Saharan Africa: 65.0 (2000), 61.7 (2012)
- Southern Asia: 45.8 (2000), 39.6 (2012)
- South-eastern Asia: 45.8 (2000), 39.6 (2012)
- Western Asia: 24.6 (2000), 24.6 (2012)
- Countries emerging from conflict: 66.6 (2000), 76.8 (2012)

Note: Countries emerging from conflicts included in the aggregate figures are; Angola, Cambodia, Central Africa Republic, Chad, Democratic Republic of the Congo, Guinea-Bissau, Iraq, Lao People's Democratic Republic, Lebanon, Mozambique, Sierra Leone, Somalia and Sudan

Source: UN-Habitat, 2013. Global Urban Indicators Database 2013
In 1960, Brasilia was celebrated as the realization of an urban planning vision based on designs by Lucio Costa and Oscar Niemeyer. Brasilia became the capital of Brazil in 1956, and became a landmark in the history of town planning. It was designed such that “from the layout of the residential and administrative districts (often compared to the shape of a bird in flight) to the symmetry of the buildings themselves – should be in harmony with the city’s overall design”. The city planning of Brasilia reflects elements of Le Corbusier’s urban planning: monumentality, order, form over function and a fundamental reorganization of society from capitalist to collectivist.52

At the same time, the city of Chandigarh, the new capital of the state of Punjab in India, was being designed according to plans by Le Corbusier. In both Chandigarh and Brasilia, foreign architecture entered into a harmonious relationship with indigenous culture, forming new and independent identities. The street planning of Chandigarh, however, did not take into consideration the informality of the markets and squatter settlements. It also segregated settlements according to castes and economic classes.

The Nigerian capital Abuja’s planning is marked by the predominance of avenues and boulevards characterized by wide streets.

Sources: Hall, 1970
Brasilia, designed to accommodate the residents of Brasilia and the "head of the bird" is the administrative centre of Brazil. The planning of the city, which was intended to shape the image of the entire country, was implicitly guided by the definition of an urban ideal based on the separation of functions, the incorporation of vast natural spaces, and a street plan whose wide traffic lanes broke the tradition of narrower streets. Unlike many ancient cities which formed over thousands of years and had the street as a key public space, Brasilia was designed with an urban ideal based on the separation of functions, the incorporation of vast natural spaces, and a street plan whose wide traffic lanes broke from the tradition of narrower streets. The city is interspersed by high speed highways with few traffic lights, the main one being Eixão, which cuts the city from North to South. Vehicles are not allowed to stop along the highway. Parallel to Eixão are two Eixinhos (small axis), which facilitate the access to loops and eventually to local streets. The Monumental axis cuts the city from East to West and also has a few traffic lights.

The modernistic city has received as much applause as criticism. Whereas it is viewed by some as a marvel in modern architecture, others view it as a city without the appropriate ingredients which make up a city, and one that does not depict the complexity of a normal city. On the street layout in the city, there is almost general agreement that Brasilia was designed for motorized transport, as opposed to pedestrians. Some analysts identify it as a city with messy streets and one that is difficult for pedestrians. This as evidenced by the high speed highways that traverse it, a general lack of traffic lights, and few sidewalks in the centre. Other analysts identify the city as a place where the street and street life do not exist, yet they are important attributes for any operational city.

Sources:
- Holston, 1989
- Epstein, 1973
- Snyder 1964
- Sauer-Thompson, 2008
- The Conscious Aim, 2013
- About Brasilia, 2013
- Sanchez-Cuenca, 2013
- Sanchez-Cuenca, 2013
- Holanda, and Medeiros, 2012
Chandigarh, the capital of East Punjab and Haryana States was conceived in 1947 and was the first pre-planned city in independent India. Like Brasilia, Chandigarh was designed based on the basic principles of modernism. The city’s master plan is a result of two planning regimes, initially by the American team led by Albert Mayer and later by a team of architects led by Le Corbusier. Mayer’s team evolved a fan shaped plan with super blocks which would act as self-sufficient neighborhood units placed along curvilinear roads. When Le Corbusier took over the project in 1951, he adopted most of Mayer’s concepts, but modified the overall plan from the fan shape with a curvilinear road network to a rectangular shape with a grid iron pattern for fast traffic roads.

Corbusier’s primary design element was a sector, which was to be a self-sufficient neighborhood unit of 800 x 1200 meters surrounded by streets of varying hierarchy. He called his hierarchical street design Les Sept Voies de Circulation - or the Seven Vs, with each V representing street level in the plan. The Vs were developed with the car as the planning unit, and all were harmoniously integrated into a network.

The first layer, V1, was comprised of the arterial/major roads with the fastest traffic flow coming in and out of the city. V2s represented major boulevards with fast traffic flow and were the main roads in the city. V3s were fast speed roads defining sectors and V4s were slower traffic streets running east to west through the middle of sectors where shops were located and V5 represented slow traffic neighbourhood streets, which formed the main loop within each sector. V6s were the access lanes leading to houses and V7s the pedestrian paths and cycle tracks blocked by walk-through gates and turnstiles to every other form of traffic. Corbusier’s plan also had a blind wall separating the sector from the V3, in such a way to prevent any door from opening to the street. Buses would be allowed to ply on the V4s, but not within the sector interiors. All shops were to be located along the V4 and extend from one neighbourhood to the next. So as to maintain a uniform skyline, heights and the architectural character of the city, Architectural controls which would be applicable to different parts of the city were developed.

The City Centre, located in sector 17 was designed on a monumental scale of uniform four-storied concrete buildings, and lay at the intersection of two main axial Roads, Madhya Marg and Jan Marg. It was also laid out along four pedestrian promenades intersecting at a nodal point, where all civic buildings were located. While comparing this sector to Brasilia’s central sector, Holanda & Medeiros (2012) identify that Chandigarh’s central sector offers a vital public space for large numbers of people, is a hub of activity and has a surprisingly urbane atmosphere for a modern city, making it more successful than that of Brasilia.

Le Corbusier’s plan was amended in the later phases of the city growth. The original low densities (17 persons/acre) were increased (up to 60 persons/acre) through the introduction of multi storied developments and reduction in plot sizes. The concept of “market places” and highrise commercial establishments were also introduced in place of the original shop-cum-flat pattern. Even then, Holanda & Medeiros (2012) identify that the city still exhibits a very low average density and in road segments surrounded by housing, the proportion between width and height of the street space is 60/70m x 7m (a ratio between width and height of about 10 to 1). As the city has grown however, so has a unique hierarchy of segregation between the rich and the poor, with some areas being better served than others.

The urban planner best known for the transformation of Paris was Georges-Eugène Haussmann. City planners imposed regulatory laws establishing standards for housing, sanitation, water supply, sewage, and public health conditions, and introduced parks and playgrounds into congested city neighbourhoods. In the 20th century, zoning—the regulation of building activity according to use and location—came to be a key tool for city planners.

The plan was by prepared by Johan Albrecht Ehrenström (1762-1847), City of Helsinki, 2012.

The model proposed by Clark (1951) expresses the urban density decreases in the central areas and increases in the suburbs, thus producing a territorial expansion of the city. Two hypotheses are the basis of this model: (i) in all cities, excluding a business and commercial area, there are densely populated areas, which decrease when moving away from the centre, and (ii) in most of the cities, as time passes the density decreases in the central areas and increases in the suburbs, thus producing a territorial expansion of the city. The model proposed by Clark (1951) expresses the urban population density as a function of the distance from the city centre as follow: \[ D(x) = e^{-a(x-r_0)^2} \]

where \( r_0 \) is the distance at which the density falls from the centre. Following Clark, various models of urban density have been used in studies about traffic planning (for example Tanner (1961) and Smeed (1963)), and some others in theoretical models on housing market (Muth, 1969). Tanner (1961) and Smeed (1963) proposed two new functional forms in their studies on city traffic. Their contributions are based on two special cases of the gamma quadratic function. The standard urban model of Alonso (1964), Muth (1969) and Mills (1972) considers urban densities that fall in absolute values as income rise, the city grows, and transport costs fall.
Harris, 2011; Pinon, 1996

Harris, 2011. The implementation of an orthogonal plan in Dakar was not a new practice, but a typical urban planning approach in other French colonial settlements in Africa and elsewhere in the eighteenth and nineteenth centuries.


Antoine and Mboup, 1992; Sanou, 1990.

Slums, according to UN-Habitat, are composed of households that lack improved water, adequate sanitation, durable housing and sufficient living area.

Caution is in order here as urbanization rates and trends in different regions are, of course, largely affected by the formal definition of what constitutes a “city” or “urban area” in every country, which in turn seriously affects comparability across regions and countries. What constitutes an urban area differs from one country to another. For example, in Uganda, a settlement with a population of more than 2,000 is classified as urban, whereas in Nigeria and Mauritius the benchmark is 10 times higher; in China, those settlements with more than 3,000 residents are considered “urban”, while only those with 60,000 or more are “cities”. Urban areas are also typically defined by the administrative and legislative functions they serve, further complicating the designation of urban settlements.

Figures of 2010 are from UNDESA, 2012.

UN-Habitat, 2010.

Hall, 1970.