

UNIT 7: Cities and Urban Land Use

Chapter 18 *Urban Location Theory and Interaction*

Chapter 19 *Urban Land Use Models*

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Unit Overview

Cities and the suburbs around them are constantly changing—in how they are laid out, how they work, and how large they are. One of the most basic questions geographers study is why people move into or out of various parts of urban areas.

Models of Urban Areas

Geographers create models to show the distribution and size of cities. They identify patterns that help explain why cities grow to various sizes and how people in different cities are connected to each other. Other models help geographers analyze how cities are organized and develop. Cities generally have zones for commerce, housing, and other functions.

Urban Landscapes and Urban Challenges

People express their attitudes and values through the landscapes they build and how they organize social spaces. The choices people make, such as how closely to live next to other people and where to build an airport or how much to plan for the future, all reflect what they consider important.

Large concentrations of people can produce both great opportunities for progress and great challenges. Some challenges result from decline, such as the movement of industry out of cities. Others result from sustainability, such as how to keep air and water clean.

Enduring Understandings

VII. Cities and Urban Land Use

- A. The form, function, and size of urban settlements are constantly changing.
- B. Models help to understand the distribution and size of cities.
- C. Models of internal city structure and urban development provide a framework for urban analysis.
- D. Built landscapes and social space reflect the attitudes and values of a population.
- E. Urban areas face economic, social, political, cultural, and environmental challenges.

Source: CollegeBoard AP[®]. *Human Geography Course Description*. 2015.

Urban Location Theory and Interaction

*Cities are extremely local and intimate places...
At the same time they are the product of complex
interactions with other places near and far away.*

—David Lanegran, *The Introductory Reader in Human Geography*

Essential Question: In what ways do geographers study and understand the growth and importance of cities?

The permanently inhabited portion of the earth's surface—what the classical Greeks called the **ecumene**—is a bewildering variety of types of communities with a range of population densities. To analyze complex situations, geographers create a model, a set of assumptions that reflect the world but simplify it enough so they can study it. The model for the ecumene includes:

- **Urban** areas (cities) with high concentrations of people.
- **Suburbs** that are primarily residential areas near cities.
- **Rural** areas (farms and villages) with low concentrations of people.

Factors Driving Urbanization and Suburbanization

A **settlement** is a place with a permanent human population. The first agricultural settlements appeared around 12,000 years ago. Before that, people survived by hunting and gathering, so they lived in temporary or movable shelters. The first permanent settlements were small enough that the inhabitants could all farm and subsist on the surrounding fields. Over time, in several places around the world, small agricultural settlements began to develop characteristics that made them the first true urban settlements, or cities. These characteristics included:

- the presence of an agricultural surplus
- the rise of social stratification and a leadership class or urban elite
- the beginning of job specialization

A surplus of food became available as irrigation, farming, and domestication of animals and plants developed. These changes enabled increasing numbers of people to live in the same location. A ruling class emerged to control the products that were accumulating and the people living in the community. Because not everyone was needed to produce food, some people could specialize in making things, such as tools, weapons, and art. Others specialized as accountants or religious leaders—the first members of a service sector.

Urbanization

The process of developing towns and cities is known as **urbanization**, an ongoing process that does not end once a city is formed. Urbanization also involves the causes of and effects on existing cities that are growing ever larger. Describing a region as urbanized indicates that cities are present there. A common statistic associated with regions, countries, and even continents is **percent urban**, an indicator of the proportion of the population that lives in cities and towns as compared to those that live in rural areas.

Urbanization is one of the most important phenomena of the 19th and 20th centuries, and geographers continue to study its development through the 21st century. Today more than 50 percent of the world's population lives in cities, and demographers estimate that by the year 2030, 60 percent will live in cities. Most of those people will be in the less developed countries (LDCs) of the world's periphery and semiperiphery. While urbanization can be positive for both individuals and societies, the challenges can be overwhelming if cities are not prepared to grow or urbanization occurs too rapidly.

Suburbanization

A suburb is a largely residential area adjacent to an urban area. **Suburbanization** involves the process of people moving, usually from cities, to residential areas on the outskirts of cities. There they form communities that are connected to the city for jobs and services. However, they are often less densely populated and less ethnically diverse than cities.

Causes of Suburbanization

Several causes contributed to the growing suburbanization in North America after World War II. Among these were economic expansion, greater purchasing power for many families, the growth of a car-centered lifestyle, and the government's construction of a vast system of new highways, which allowed workers to commute from their city jobs to suburban homes. In the United States, the Federal Housing Administration provided mortgage loans for families to move to the suburbs, which were newly zoned for single-family housing.

Racial tensions provided another impetus toward suburban growth. As African Americans came to the North in search of jobs and better education,

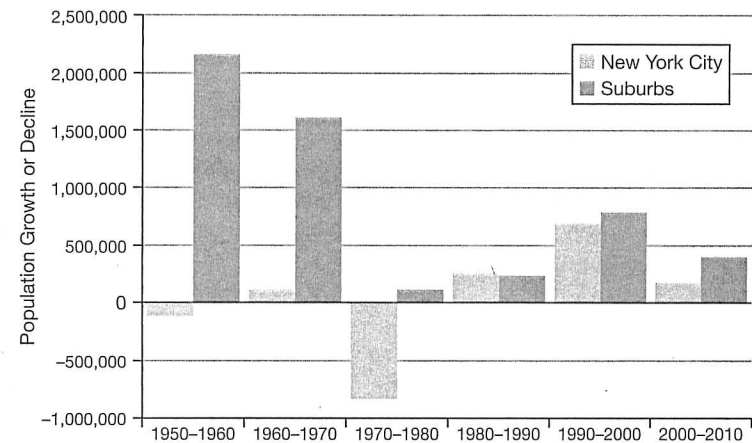
many white Americans moved to the suburbs in what became known as “white flight.” Government investment in continued suburban growth, along with a lack of investment in inner cities, hastened both urban decline and suburban growth. Industries and jobs left the cities, and residents followed them. In addition, highways were sometimes built in locations that uprooted or divided existing urban communities.

Shifting Trends

The process of suburbanization is one effect of urban growth. In the developed world, especially in North America, it has been the most prominent change in urban areas since the middle of the 20th century. In 1960, the U.S. population was roughly equally divided: about 60 million people lived in each of the three types of areas: urban, suburban, and rural. Since then, the rural population has dipped slightly and the urban population has increased a little. Just over half of Americans now describe where they live as suburban.

Suburbanization has affected rural areas by increasing population density, building homes and businesses on former farmlands, and adding new residents from urban backgrounds to communities. However, suburbanization itself is currently changing in North America, as some suburbanites return to live in the city in a process called **reurbanization**, while others move farther out into rural areas and work remotely, in a process known as **exurbanization**. When an established town near a very large city grows into a city independent of the larger one, it is called a **satellite city**.

POPULATION CHANGE IN NEW YORK CITY AND ITS SUBURBS



Source: Adapted from Wendell Cox, “The Accelerating Suburbanization of New York.” *New Geography*, 2011.

The graph of city and suburban growth in New York illustrates the massive growth of suburbs after World War II as well as the later process of reurbanization.

Influence of Site and Situation on Cities

The most prosperous of the earliest agricultural settlements grew into urban centers shortly after the Neolithic Revolution, about 10,000 B.C.E., as human groups began to grow crops and domesticate animals. The most successful of these settlements became the world's first **city-states**.

Early City-States

City-states consisted of an urban center (the city) and its surrounding territory and agricultural villages. A city-state had its own political system and functioned independently from other city-states. The population in the surrounding villages and territory received services and protection from the urban center. Because of the wealth of these communities, they were often raided by other groups. As a result, defense was a primary consideration, and military leaders evolved into political rulers, known as kings.

Early city-states emerged in several locations around the globe in **urban hearths**, areas generally associated with river valleys in which seasonal floods and fertile soils aided the production of an agricultural surplus. These urban hearths included:

- the Tigris-Euphrates Valley (Mesopotamia) in modern Iraq
- the Nile River Valley and Nile Delta in modern Egypt
- the Indus River Valley in modern Pakistan
- the Huang-He floodplain in modern China

Urban centers also emerged in Mesoamerica (in modern Mexico) and in the Andean region of South America.

City-states eventually coalesced to form early states and empires. The ancient Babylonian Empire grew from the original city-state of Babylon. Examples of city-states through history include those of Classical Greece (Athens, Sparta, Corinth), those of the Middle Ages in Europe, and Venice and Italian city-states during the Renaissance. Monaco, a city-state located entirely within the boundaries of Italy, has endured to modern times. Vatican City and Singapore are also modern city-states, though they did not evolve from previous agricultural settlements.

Centers for Services

As cities grew, more people developed specialized skills other than producing food. This changed the relationship between cities and the areas around them. City residents depended on farmers for food. In return, people in cities focused on supplying services for their inhabitants and the inhabitants of surrounding regions.

Early cities often specialized in particular services. Some emerged as administrative centers from which the elite ruled. Others, often associated with

important shrines, became religious centers. Defensive strongholds, university towns, and centers of specialized production (located at resource sites) also emerged.

Defining Cities

Most definitions of city describe a place in which there is a relative concentration of people. Cities are places where people come together to build a nucleated, or clustered, settlement.

Legal Definition of a City

The easiest way to define a city is legally. A city is the territory inside officially recognized boundaries. This definition is useful for determining the precise population, for taxing residents, and for establishing and enforcing governing rules. Most large cities today, as defined legally, share boundaries with adjacent cities, yet those boundaries are visible only on a map. On the ground, a person leaving one city might have no idea they were entering a new (legal) city.

Metropolitan Areas

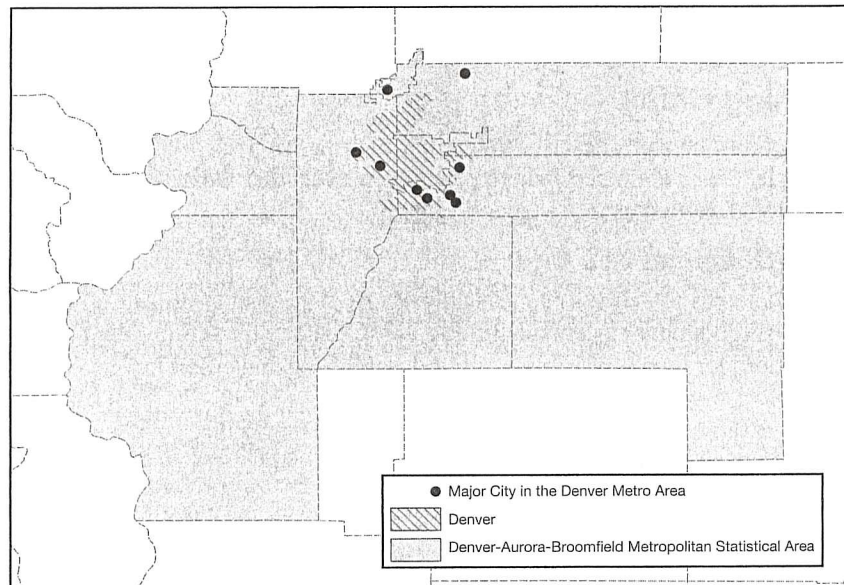
A collection of adjacent cities across which population density is high and continuous is a **metropolitan area**, sometimes called a **metro area**. Most large cities in the world today are really metro areas of a series of legally defined cities, but they are referred to using only the name of the largest city. For example, the metro area of Denver, Colorado, consists of the cities of Denver, Aurora, Lakewood, Englewood, Greenwood Village, and other neighboring, legally defined cities.

In the United States the term **metropolitan statistical area** (MSA) is another way to define a city. An MSA consists of a city of at least 50,000 people, the county in which it is located, and adjacent counties that have a high degree of social and economic integration or connection with the urban core. Similarly, **micropolitan statistical areas** are cities of more than 10,000 inhabitants (but less than 50,000), the county in which they are located, and surrounding counties with a high degree of integration. Note that this designation is really one in which a city is defined as a **nodal region**, or focal point in a matrix of connections.

An urban area can also be described by its morphology, or physical characteristics, such as the buildings, streets, public places, and homes:

- The built-up area is where the landscape has a high concentration of people and things constructed by people.
- The places where built-up areas begin to give way to open spaces and underdeveloped areas are the outskirts of the city.
- This end of the continuously built-up area can be considered an urban border, whether or not it coincides with a legally defined city boundary.

THE DENVER METROPOLITAN AREA



Population Characteristics

A third way to define cities relies on social characteristics to distinguish urban areas. **Social heterogeneity** is particularly high in cities, meaning that the population of cities, as compared to other areas, contains a great variety of people. Diversity in cultural interests, sexual orientations, languages spoken, professional pursuits, and other characteristics are present in cities to a much larger degree than in small towns or rural areas.

One reason cities are diverse is because they are centers of immigration. In addition, because of the higher population density and the relative anonymity of cities, urban residents are generally more accustomed to diversity. The large size of the population of a city means that it is easier for individuals with less common cultures, interests, or ways of life to find others who share them.

Transportation

Cities have grown in number and size as improvements in transportation have. Trains, buses, and cars have enabled people to move farther from the center of the city, but still visit or work in the city. Hence, the urban area expands. That change illustrates how **time-space compression**, in the form of transportation improvements, has led to urban growth. The development of the internet—to transport ideas rather than people—has allowed more and more people to work from home, which has further increased the distance people can live from the center of a city.

Borchert's Model

Geographer John Borchert developed **Borchert's Model** to describe urban growth based on transportation technology. Each new form of technology produced a new system that changed how people moved themselves and goods in and between urban areas. He divided urban history into four periods, which he called epochs. Each epoch had profound effects on the form (shape), size, density, and spatial arrangement of cities. The epochs are shown in the table below.

BORCHERT'S MODEL OF URBAN GROWTH		
Epoch	Time Period	Conditions and Effects
Sail-Wagon	1790–1830	<ul style="list-style-type: none"> Water ports became very important. Poor road conditions made long-distance travel between cities difficult.
Iron Horse	1830–1870	<ul style="list-style-type: none"> Steam engines powered boats, which promoted the growth of river cities. Regional rail networks connected cities. Rail lines connected resources and industrial sites.
Steel Rail	1870–1920	<ul style="list-style-type: none"> Transcontinental railways emerged. Cities emerged along rail lines in the interior of continents.
Auto-Air-Amenity	1920–1970	<ul style="list-style-type: none"> Cars allowed cities to spread out. Airport hubs emerged. Cities became far more interconnected.

While Borchert's model ended in 1970, it could be expanded. Since 1970, some cities have encouraged mass transit (rail lines), biking (separate bike lanes on roads and new bike paths), and walking (car-free areas in cities).

Infrastructure

Changes in infrastructure within cities themselves also had important effects on the urban structure. The earliest urban centers were **pedestrian cities**, ones shaped by the distances people could walk. A horse-and-buggy era allowed for city size to increase as people could move farther from the center and its concentration of services and jobs. Streetcar systems encouraged the movement of the population even farther from the center of a city, and growth became concentrated along the lines of these small urban rail systems. **Streetcar suburbs**, communities that grew up along rail lines, emerged, often creating a pinwheel shaped city.

The advent of the automobile had profound effects on the growth of cities. Using cars and the highways built to facilitate their movement, the population

of cities was able to spread out over ever-increasing distances from the urban core. The lower density suburbs that emerged around original cities developed as separate legal cities but functioned as part of the metropolitan area focused on the central, or original, city. Transportation methods thus had profound effects on the growth and shape of cities.

Distribution and Interaction of Cities

Cities today range in size from just a few thousand people to ones such as Karachi, Pakistan that are over 20 million. Often a city exists in an **urban system**—an interdependent set of cities within a region. Models have emerged to help explain the distribution and interaction of these urban systems.

Gravity Model

The **gravity model** states that places that are larger and closer together will have a greater interaction than places that are smaller and farther away from each other. This model can be used to predict the flow of workers, shoppers, vacationers, mail, migrants, and nearly any other flow between cities. It holds that there are greater flows to bigger cities and greater flows between nearer cities.

Interactions between cities are complicated by factors beyond size and distance, however. Cities such as Orlando, Florida, and Las Vegas, Nevada, are tourist destinations that attract far more visitors than their size and their distance from other cities alone could predict. Similarly, religious sites such as Jerusalem and Mecca, government centers such as Washington, D.C., and various cultural destinations distort effects predicted by the gravity model. However, the basic theory applies to most places.

Rank-Size Rule

The **rank-size rule** describes one way in which the sizes of cities within a region may develop. It states that the n th largest city in any region will be $1/n$ the size of the largest city. That is, that the rank of a city within an urban system will predict the size of the city. For example, the third largest city in a system that exhibits the rank-size distribution would be approximately one-third the size of the largest city.

Geographers consider rank-size distributions to be characteristic of well-developed regions or countries. Such distributions are also more common in federal governments that typically share power with other levels of government. A rank-size distribution includes cities of all sizes in the system. This implies that there are cities with a wide variety of services available within the system, from very high order services in the largest cities to lower order ones in the smaller cities. As a general rule, geographers consider rank-size distribution to be one indicator of an urban system that can efficiently provide needed services to its population. Countries that demonstrate the rank-size rule include the United States, Canada, Australia, and India.

Primate Cities

If the largest city in an urban system is more than twice as large as the next largest city, the largest city is said to have primacy, or be a **primate city**. A primate city is usually a social, political, or economic hub for the system, and it offers wider services than do the many smaller cities. Because services are more centralized, it is more typical of less developed countries and regions. In addition, countries that follow a unitary form of government or extremely strong central government often follow a primate city model.

The United Kingdom exhibits urban primacy. London is by far the largest city in the country. However, the relatively small size of the country, its unitary government, and its well-developed transportation infrastructure all reduce the need for a number of medium-sized cities and mid-level services. In the United Kingdom, people can get to London for services relatively easily. Northern Scotland is less than a two-hour flight from London.

Mexico illustrates a different model for a country with a primate city. Mexico City provides many services that are not as easily available to portions of the population. Across large portions of northern Mexico, people would have to travel great distances to receive even mid-level services due to the lack of medium-sized cities. Of course, population density is thin in these regions as well, illustrating that a simple knowledge of rank-size distribution or urban primacy is not enough to completely understand an urban system.

TWO PRIMATE CITIES: LONDON AND MEXICO CITY		
Trait	United Kingdom	Mexico
Largest Urban Area	London: 14.0 million	Mexico City: 21.2 million
Second Largest Urban Area	Manchester: 2.6 million	Guadalajara: 4.3 million
Distance from Primate City to Farthest Edge of Country	675 miles	1,750 miles
Transportation Network (buses, trains, planes)	Excellent	Poor
Population Density	660 people/sq. mi.	148 people/sq. mi.

Central Place Theory

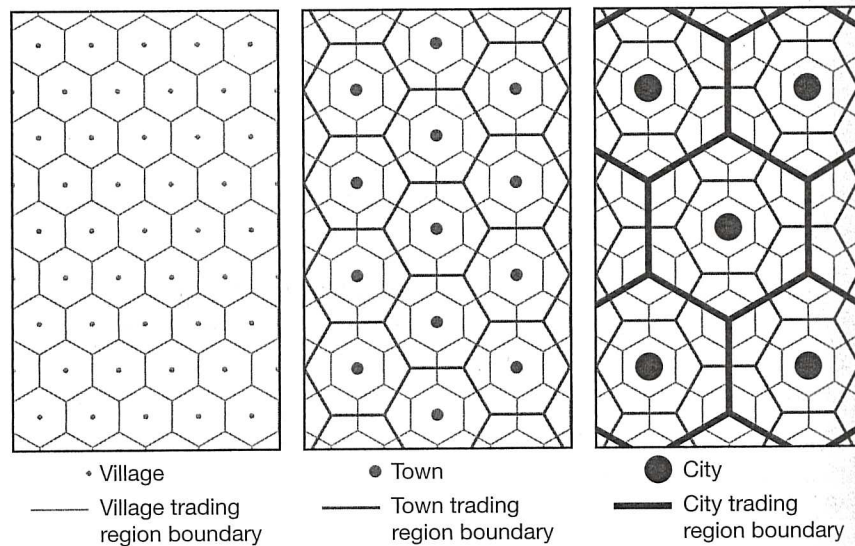
Proposed by German geographer Walter Christaller in 1933, **central place theory** was developed to explain the distribution of cities of different sizes across a region. Christaller defined a **central place** as a location where people go to receive goods and services. It might be a tiny community, such as a hamlet, with only a convenience store, a post office, and a religious center. Or it might be a slightly larger village, or town, or small city with more stores and services. Or the central place might be a major city, where one can get direct

air flights to other major cities, or obtain a heart transplant. In Christaller's model, each level, or size, of settlement would be evenly distributed across space.

The Shape of Market Areas

A **market area** surrounds each central place, for which it provides goods and services and from which it draws population. Christaller chose to depict these market areas as **hexagonal hinterlands** because this shape was a compromise between a square (in which people living in the corners would be farther from the central place) and a circle (in which there would be overlapping areas of service). Nesting hexagons allowed for central places of different sizes to distribute themselves in a clean pattern across the region.

CHRISTALLER'S CENTRAL PLACE THEORY



Threshold and Range

What determines which services will be available in any central place? How far apart should central areas of the same population size be located? Central place theory uses the concepts of threshold and range to answer these questions.

Threshold is the size of population necessary for any particular service to exist and remain profitable. Services with a very low threshold, such as a convenience store or a gas station, are present even in very small central places. Restaurants, hospitals, high schools, and department stores have higher thresholds, so they require a larger population within the market area to survive economically. Only in the largest market areas can services appear that depend on the support of huge populations: stock market exchanges, major

sports teams, symphony orchestras, and elite research centers. As cities grow in size, the number and variety of their services increase with the population.

Range is the distance people will travel to obtain specific goods or services. People will travel very far for high-order services such as wedding rings and heart transplants, but they are less likely to be willing to travel very far for basic services such as fast food or toothpaste. This helps explain why fast food restaurants can be found in nearly any town but a shop dealing in diamond jewelry would be found only in larger cities.

Megacities

Megacities are the world's largest cities and typically have more than ten million people. These urban giants often exert an influence that is felt regionally and sometimes worldwide. This influence is due to the size of their populations but in other cases their influence is derived as much from their political, economic, and cultural power.

Urbanization in the Developing World

Megacities were once found only at the centers of large empires or the most powerful countries. However, that pattern has changed. In the past century, a combination of high birth rates and rural-to-urban migration in less developed countries has made megacities more common in these countries than in the developed world. Of the 30 largest metropolitan areas in the world in 2015, about half were in semiperiphery or periphery countries:

- three were in Africa: Cairo, Lagos, Kinshasa
- five were in South Asia: Mumbai, Delhi, Kolkata, Dhaka, Karachi
- five were in South America: Sao Paulo, Buenos Aires, Rio de Janeiro, Lima, and Bogota

Megacities in relatively poor countries face the same challenges as megacities in wealthy countries, but without as many resources to respond. Social problems between ethnic groups, joblessness, lack of infrastructure, inadequate housing, and environmental problems, such as Mexico City's severe air pollution, are common in these megacities.

World Cities

Cities such as New York, London, Tokyo, and Paris are **world cities**, or **global cities**, ones that exert influence far beyond their national boundaries. All are currently media hubs and financial centers with influential stock exchanges, banks, and corporate headquarters. Many are the headquarters of international organizations. For example, New York is home to the United Nations.

Some geographers also include cities that are powerful in a particular region as world cities. These include Dubai in the Middle East, Singapore in Southeast Asia, Shanghai in East Asia, and Sydney in the South Pacific.

Megalopolis

The term **megalopolis** goes back to the early 1900s and describes a chain of connected cities. It became more common after 1961, when French geographer Jean Gottman used it to describe the continuously developed string of cities from Boston through New York and Philadelphia all the way to Baltimore and Washington, D.C. The “Bos-Wash Corridor” now includes nearly 50 million residents.

These cities had grown until they formed a single **conurbation**; they had essentially merged into a single, uninterrupted urban area. The cities crossed state boundaries and exceeded the definition of a metropolitan area, which is focused on a single, urban center. Gottman noted that, although legally the major cities remained separate, they and their suburbs had become a single region that had taken on some characteristics of a single, massive city.

Since that time, with urban growth occurring across the planet, other cities have combined into megalopolises. The corridor in California from San Diego through Los Angeles to San Francisco is a single, growing metropolitan corridor on the West Coast of the United States. Tokyo-Yokohama is a megalopolis in Japan.

GEOGRAPHIC PERSPECTIVES: THE PLANNED CITY OF BRASÍLIA

Built from the ground up in just four years, Brasília became Brazil’s new capital city in 1960. The country’s former capital, Rio de Janeiro, was more densely populated and more developed than the rest of Brazil, and located in the southeastern corner of the country. The Brazilian government sought to relieve the population pressure around Rio, and promote further development in its interior by locating its capital there. Brasília is an example of a forward-thrust capital, a seat of government built or relocated in a spot to promote development in a region of a country.

A New Plan

Brasília’s contemporary architectural plan was reminiscent of the City Beautiful Movement, which highlighted grand monuments and attempted to promote a more cohesive society. The designers discarded the radiating streets and plazas, as well as other references to Brazil’s traditional cultural landscape associated with its colonial past.

Brasília Today

While Brasília boasts impressive civic buildings and massive open spaces, critics say it lacks a sense of place because it has too few streets where people can walk and too few public spaces for people to congregate.

Brasília’s utopian ideal physically embodied the country’s developmental ambitions, as its original design was in the shape of an airplane. Initially designed to house half a million people, it has swelled to over 2.5 million, boosted by substantial internal migration. However, the originally designed central city mostly houses the rich and politically connected. Most of Brasília’s residents live in satellite cities—reminiscent of Brazil’s cultural urban past. Plazas and streets in these areas bustle with people and energy, while Brasília’s core remains unfriendly for pedestrians. Brasília’s story illustrates that while planned cities are nationally—and even globally—ambitious in design, their long-term layouts often revert back to the patterns people find comfortable.

Cities Similar to Brasília

Brasília is just one of many examples of a city built to express a single, unified vision of how space in a city should be organized. In the 1700s, Russia’s tsar, Peter the Great, replaced a small fort in the northwest of his empire with a new city, Saint Petersburg, that he hoped would increase trade between Russia and western Europe. In the 1940s, the United States wanted an isolated location in which to develop atomic weapons. It bought up land around the sparsely settled community of Los Alamos, New Mexico, and created an entirely new town.

KEY TERMS

ecumene	metropolitan statistical area (MSA)	rank-size rule
urban	micropolitan statistical area	primate city
rural	nodal region	central place theory
suburb	social heterogeneity	central place
settlement	time-space compression	market area
urbanization	Borchert’s model	hexagonal hinterlands
percent urban	pedestrian cities	threshold
suburbanization	streetcar suburbs	range
reurbanization	urban system	megacities
exurbanization	gravity model	megalopolis
satellite city		conurbation
city-states		world cities
urban hearths		global cities
metropolitan area		
metro area		