

Ch 13: Better Together...?

Introduction: Uniquely Human

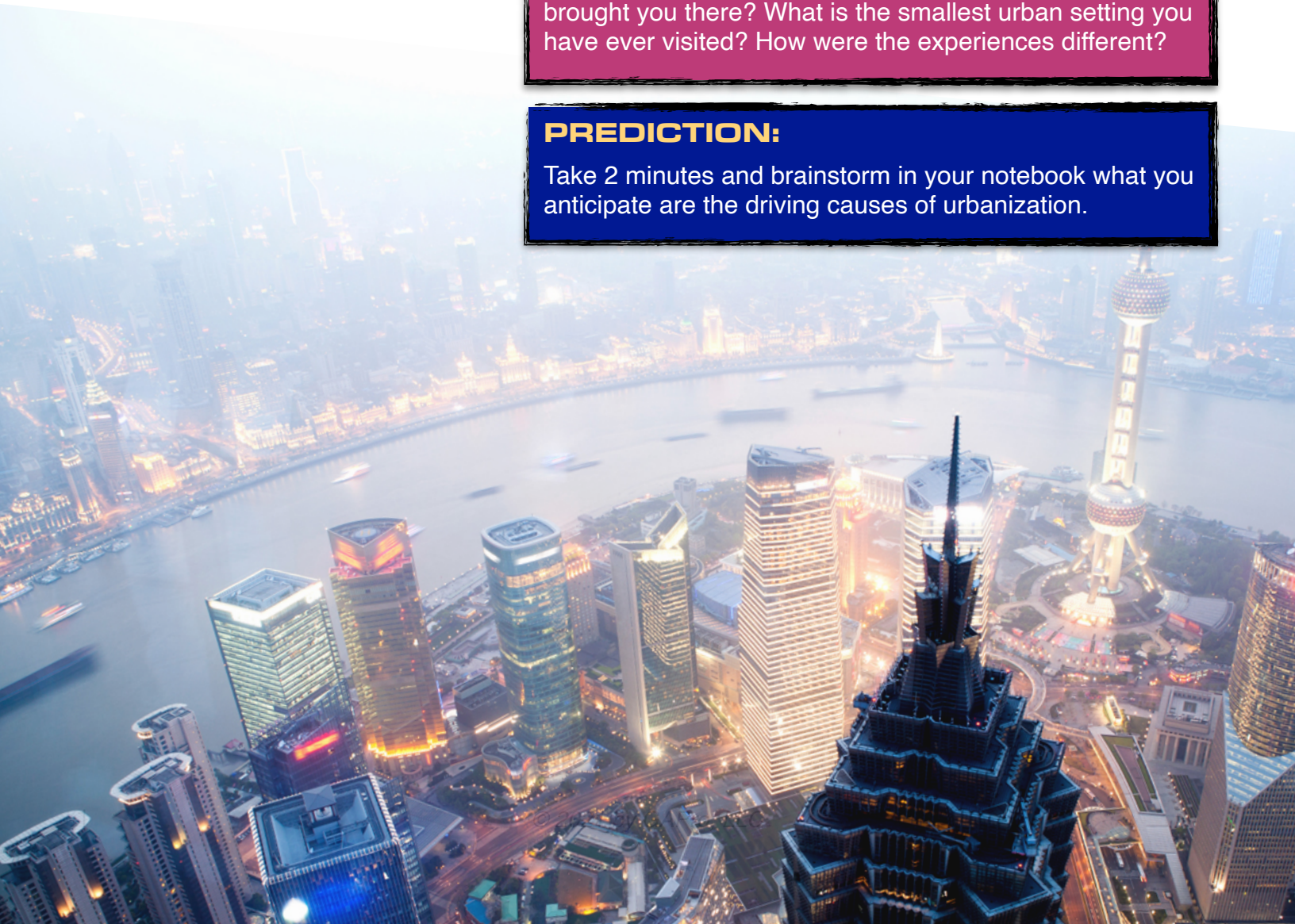
Cities: The unique expression of shared humanity. Cities are the human beehive, the human ant hill; a built landscape that fulfills human needs and reflects how groups of humans live together. Modern urban spaces are unmatched in size, scope, and impact by any other creature on the planet. They are the embodiment of the human experience: what life and living looks, sounds, tastes, and smells like when people choose to live in dense communities instead of in dispersed isolation. They are the intersection point where all human societal characteristics converge into a physical expression: economics, development, culture, language, religion, politics, agriculture, and industry.

For the first time in human history, over half the world's population lives in urban centers. Humans are migrating to urban centers at rate of 1 person every 3 seconds. By 2050, it is projected that over 66% of humanity will be urbanized. What is driving this trend? What are the benefits of living in settled communities? What are the challenges created by expanding high-density human settlements? What do the cities of the future look like? Are humans truly better living together?

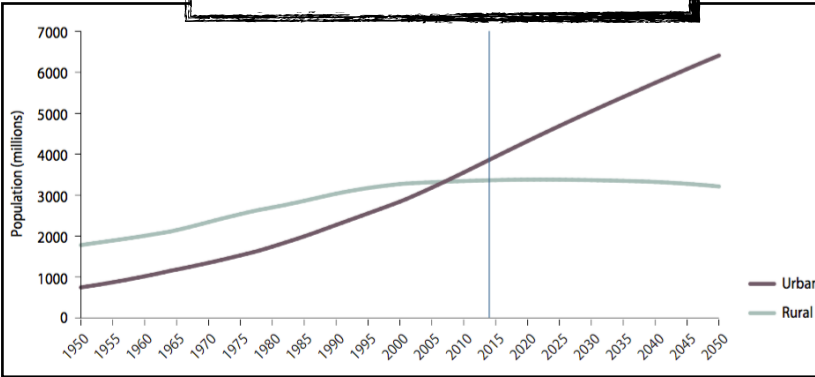
Personal Connection: An urban setting is where an agglomeration of people live and do life together. What is the largest urban area you have ever visited? What brought you there? What is the smallest urban setting you have ever visited? How were the experiences different?

PREDICTION:

Take 2 minutes and brainstorm in your notebook what you anticipate are the driving causes of urbanization.



Global Urban Growth



Urbanization

1900	2 out of every 10 people lived in an urban area	
1990	4 out of every 10 people lived in an urban area	
2010	5 out of every 10 people lived in an urban area	
2030	6 out of every 10 people will live in an urban area	
2050	7 out of every 10 people will live in an urban area	

A. Basic Components of Urban Spaces

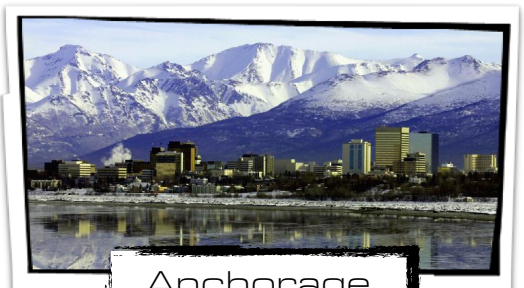
While urban spaces are highly complex, they all rely on core components for their success and continued existence:

Land

Urban spaces exist on land that has the appropriate site features to support human life. If a city is like a human body, the land is like the bones; it is the skeletal structure and gives shape and support to the body. So too, the land and its qualities create the structure of the urban space, proving the support for all other features and functions. The land must have access to an ample amount of clean drinking water. Portions of the land must be arable, allowing for a stable food supply. The land must be positioned in a climate suitable for human life, meeting the Goldie Locks Principle: not too hot, not too cold... but just right. Land must have a fresh water source, with the largest urban centers being located on rivers and having deep natural harbors. Finally, prime areas of urban settlements need natural resources useful for economic gain. This could be access to extractable resources from the earth or access to the ocean allowing for international trade.

In the 21st century, humanity is no longer bound by the confines of its environment. Environmental determinists have proposed that if any of the features listed in the previous paragraph are not sufficient, the urban space will be unsustainable. This statement has been true for the vast majority of human history, when people were bound by the limitations of their geography. *Possibilists* counter that with advanced industrial technology, many of these obstacles can be overcome to make the land livable. In the USA, extreme heat and cold have been counteracted by Heating Ventilation and Air Conditioning (HVAC) Systems, allowing urban spaces to develop in the glacial landscape of Anchorage, Alaska as well as thrive in the desert of Phoenix, Arizona. Humans are using machines to alter and modify physical landscapes to allow human settlement. In Miami, Florida swamps and wetlands were drained to make land available for building. In the Zuiderzee, Netherlands, dikes and hydraulics have been developed to push back the sea to create polders - low-lying areas of land once covered by sea/ocean water now made usable for agriculture and habitation.

Within urban spaces, systems of determining landownership have been created by federal and multinational governments to claim sovereignty and legitimacy over land. Regional and local governments determine the legal framework for land rights or ownership. Land can be zoned for public use, making it available to the residents of the city or government. Land can also be zoned for private ownership, where corporations or individuals can purchase the rights to develop the land for their own purposes.



Anchorage,
Alaska



Miami,
Florida



Zuiderzee,
Netherlands



In modern times, an urban space must have a favorable situation. A city's *situation* is its relative location to other resources and urban centers. Situation asks which other cities are nearby and how well are they connected. For example, on the New England coast, Washington D.C., Baltimore, Philadelphia, Trenton, and NYC are situated within 200 miles of each other in a straight line. These major urban centers are home to 52 million people and are connected by an extensive network of highways and railways. Comparatively, the Helena is the capital of Montana, is home to 30,000 people, and is over 800 miles away from a city with over 500,000 people (Denver, Colorado).

For a modern urban space to be successful, it must be accessible and interconnected to people and goods from other urban spaces. To achieve this, urban spaces are situated along coast lines and transportation corridors, allowing the urban space to be interconnected to the larger regional and global network of cities.

Permanent Population

Every urban space needs a permanent, stable population. A population is the flesh and muscle of the city. These are the individuals who are committed to living in the urban space, taking part in sustaining the success of the established community. They are the people who own, maintain, and improve upon the land. They are the government leaders, business owners, and workers who make the economy thrive. They are the consumers who purchase local goods and services. They are the tax base, funding local government initiatives.

While all residents play a role in the success of the urban space, they do not all live together in equal harmony. Unfortunately, populations often become divided by economic status. The wealthy agglomerate in their high rise condos, gated communities, and expensive suburban housing developments. They purchase the best land in the best locations, install barriers to entry, and segregate themselves from the non-wealthy.

The communities of the middle class agglomerate in quiet suburbs or well-positioned condos/apartments, the next best land not claimed and used by corporations or wealthy individuals.

The impoverished agglomerate in the least desirable spaces and their housing options infill the spaces unclaimed by the rich and middle classes, usually forming urban slums and squatter settlements wherever space can be found. If the wealthy decide they want to use the land poor people are living on, they use their wealth to acquire that land and force the poor to relocate to another location.



Populations also become divided by their ethnicity. Through chain migration, *ethnic enclaves* emerge within urban spaces since people most frequently move to locations to live amongst others who share their lifestyle and culture. While government policies try to encourage a mixing of cultures, the reality is that a majority of urban and suburban communities have homogenous populations with very little ethnic diversity.

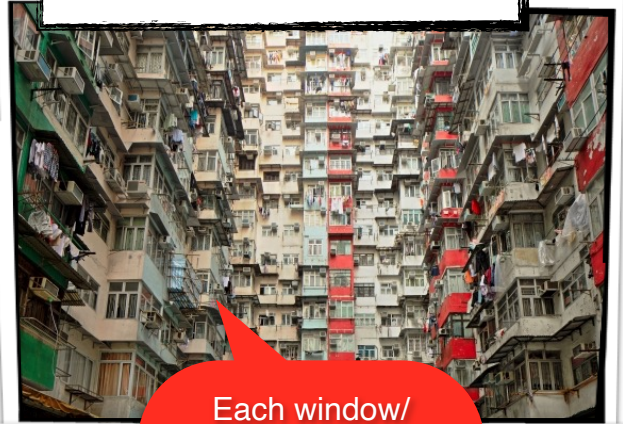
Housing

A permanent population needs a form of reliable and affordable housing. Housing is the system connecting people to the land, similar to how ligaments connect muscles to bones. Housing can be categorized based upon the density of residents in the building/complex and upon the ownership of the land and its structures. The type and quality of housing are directly correlated to the level of technical advancement and economic development of the society.

Three density classifications for urban housing are:

- **High Density.** High density housing uses multistory vertical architecture to house a large number of people and families on a small amount of land. This features high-rise apartment buildings and condominiums, typically located near the CBD or highly urbanized locations. High density housing seeks to maximize the benefits of agglomeration, with many high rise apartment buildings having 100-1,000 apartments per building. The clustering of people into high rise towers creates a *shared benefit of cost*: dividing the cost of the land, building, taxes, maintenance, and amenities amongst a large number of residents. The agglomeration of people, governments, and businesses is able to efficiently meet the thresholds needed to provide infrastructure, public transportation, and other services and amenities.
- **Medium Density.** Medium density housing provides residence to multiple families/residences, but fewer than high density. Medium density housing includes smaller apartment buildings, townhomes, and duplexes - housing with between 2 to 50 units per building. Medium density housing tends to provide each residence with more space within the building while still having similar agglomeration benefits. Because of the larger land requirements of medium density housing, they tend to be placed further away from the CBD.
- **Low Density.** Low density residential has a low number of people living on a larger amount of land. Typically, low density housing comprises single family homes in suburban developments, McMansions, and expensive gated communities. Each of these feature a home that typically provides more living space (square footage) than an apartment or town home. The average apartment in the USA is 950 square feet, while the average single family home in the USA is 2,000-2,600 square feet. BUT, a medium density apartment building is 22,000+ square feet containing 15 apartment units. Single family homes come with extra property surrounding the home that serves as a front and back yard. Gated communities are the most lavish collections of single family homes, positioned on the nicest land, with the most expensive amenities, and a supervised/locked gate to control who is allowed in and out. McMansions sit in the middle: attempts to be large and look lavish like the gated communities, but built with cheap materials and construction. Because of the larger amounts of land, low-density housing tends to be further away from the CBD.

High Density Housing



Each window/
balcony = 1 family or
household



Ugh...
Let's build a
fence. We might
have to see



Housing can also be categorized based upon who is paying for or owns the housing. There are four basic categories:

- **Publicly Subsidized Housing.** Publicly Subsidized Housing (also referred to as Public or Government Housing) is heavily *subsidized* by the government. The vast majority of public housing is high density housing.

Depending on a society's government, public housing can serve a variety of purposes. In societies with limited land suitable for housing, land values become extremely expensive. In these situations, the government subsidizes all the housing for the community, or else no one would be able to afford to live. To illustrate, in Singapore the city government subsidizes ALL housing for everyone. Residents of Singapore have to apply to the Housing and Development Bureau for the opportunity to rent or buy an apartment or flat, depending on their income level. Rich and poor must both go through the government, as housing is so limited there are very few alternatives. It is common for people to wait 2-4 years to be approved for a flat.



Public housing is a tool that can be used to help low income residents and families afford housing. The USA uses subsidized public housing to provide affordable housing to low-income residents whose salaries are at or below the poverty line. These residents receive an apartment for discounted rent, or in extreme situations, no-rent at all. However, unlike Singapore, public housing in the USA tends to be located in less desirable locations with less-than-the-best construction when compared to other apartments for rent in the city.

Public Housing in NYC

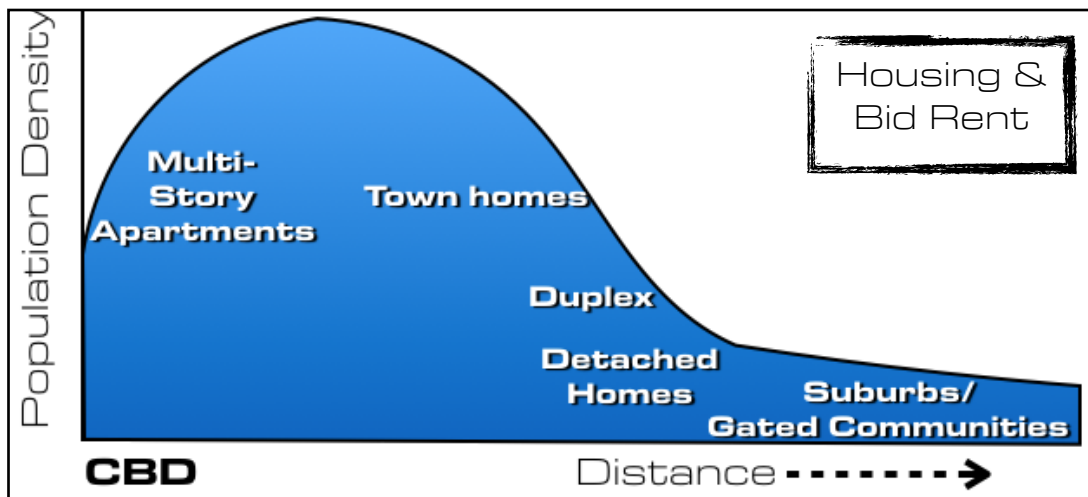


- **Corporate Ownership.** Housing and apartment complexes can be owned by businesses who then rent the units to people for a profit. These residences vary in location, size, and construction quality: from lower-income apartments and mid-range townhouses to suburban homes. The companies work to meet the demand of residents looking to migrate to the area and for those who are not in the position (or have the desire) to purchase their own place.
- **Private Ownership.** Individuals and families may be able to purchase the land and building for themselves. Typically, such a purchase requires a *mortgage*, a loan from a bank to purchase property which is repaid over the 15 to 30 years. People can purchase whatever they can afford. This could be a 50 year old starter home; a 3,000 square foot suburban single family home; or a penthouse condo on top of a high rise downtown.

Squatter Settlements & Homelessness



- Homeless/Squatters.** Residents who cannot afford to purchase a home, cannot afford to pay rent, and who do not qualify for government housing find themselves in a very difficult situation. They need a place to sleep, but their circumstances do not give them the means to have a specific space of their own. These individuals can choose to be homeless and sleep on the streets or in public places. In some cities, there are opportunities to be *squatters* and take up residence and build make-shift housing in places no one wants to live or where the government does not strictly enforce land-ownership rights. This could be in an abandoned building, around a cemetery, on a garbage landfill, along an open sewer, or on surrounding land undesired by local businesses for development. Squatter residents come from a variety of backgrounds. Some are farm workers who lost their primary sector jobs to mechanization and are trying to start a new life with nothing to their name. Some are families trapped in a cycle of poverty, trying to get by from meal to meal. Some are former criminals, who have lost their rights to government housing and food stamps because they went to prison. Some are mentally ill, who do not receive the medical support they need and cannot comprehend the complicated systems in place to get the help they need. Every shanty has its own unique story.



In the MDCs, people choose to live in different housing situations as they progress through life. Young adults fresh out of school typically choose to rent some type of medium-to-high density apartment that is affordable and close to their place of employment in the city or suburbs. For those who can afford it, they like to live near cultural entertainment and recreational amenities. As people progress through their careers, many choose to find a spouse. These DINKs (Dual Income No Kids) and Yuppies (young people with good jobs) move from their rental apartment into a medium-density townhouse or small starter home - using their two paychecks to renovate their first dwelling together. Couples become families. With kids, the more urban life is often deemed unsuitable for young children so young families may move away from the CBD to the low-density suburbs. Homes with backyards in neighborhoods with other young families are most desired. The suburbs specialize in stores for families, schools for children, and parks and recreation become high priorities. As children grow, and as salaries improve over time, families look to afford bigger houses in communities with more opportunities for their children. Eventually, the children become adults and move out to seek their own fortunes. The empty nesters do not need the big house, large lawn, and adventure playgrounds. They move back toward the conveniences of the city, into a medium density townhouse or elderly communities. When old-age and chronic illness take their toll, individuals move into high density elderly care facilities. As one household moves to the “next stage” of their life, it makes housing available for the people who are just starting that stage of their journey.

Different Homes for Different Stages of Life



Food

In an urban settlement the residents require access to an appropriate quantity of nutritious food. The food systems are the stomach and digestive system of the city. Since the urban residents are working outside the primary sector, markets and restaurants must have access to enough food for people to purchase with their incomes to sustain the entire population. This is accomplished through one of two paths. The first path is by self-sustaining with local farms from arable land located near the urban center (#VonThunen). The second path is through regional and global supply chains. Through the use of industrialization, refrigeration, containerization and transportation, food is grown on mega farms to achieve economies of scale and then distributed globally to urban centers. Thus, an urban center's success in feeding its people is primarily measured by its accessibility and connectivity to the distribution network.

Recreation & Cultural Landscape

Urban spaces struggle to provide appropriate creative outlets for residents. This is the emotion of the city. People who have put in a 50-80 hour work week want an opportunity to relax and have a good time. For recreation companies to stay in business there is a *threshold*, or bare minimum number, of customers needed to keep the business profitable and functioning. Since cities have a high density of employed residents, major cities easily meet the threshold to support large forms of entertainment such as professional sports teams, live theater and performances, recreation centers, libraries, convention centers, museums, parks, dining with outdoor seating, dance clubs, etc.

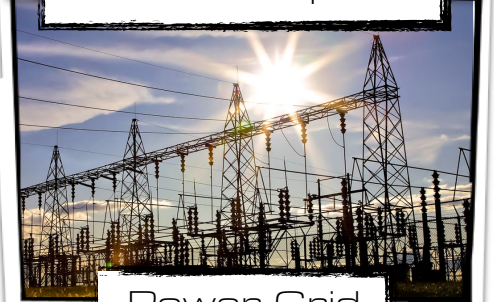
The uniqueness of each urban space creates a special *sense of place*. The language(s) spoken and displayed on the signs, the toponyms of streets and communities, religious buildings, unique smells of the food, the aesthetic of the vertical architecture... all create a special experience unique to each urban space. A quick glimpse of the Eiffel Tower on the skyline, and people immediately know it is Paris. Tower Bridge, Big Ben and the Eye are essentially tied to London.

Infrastructure & Services

Modern businesses, industries, and high density populations require access to a high level of infrastructure and related services. These are the immune system and endocrine systems of the body. High density populations need clean, potable water and sanitation services (#ToiletsSaveLives). Hospitals, EMS, police, and firefighters help keep the population safe and healthy. Every aspect of a city requires some form of energy to power its machines. Even though urban space takes up less than 2% of the earth, it consumes 75% of the resources. Natural gas pipelines must be planned, installed, buried, and marked in places where they can be accessed, but also be out of the way in case of an accident. Electricity, internet, and cell phone infrastructure have become urban essentials, whose wiring must be planned on a power and communication grid. Wires, towers, transmitters, and other connective equipment must be strategically planned and built to make sure that the quantity of users does not overwhelm the system to the point of failure. Police, fire stations, EMS, and health care services must be zoned and coordinated with business and residences to provide help within a timely manner. A poorly managed fire can consume multiple street blocks. A flu outbreak in a city with public transportation can spread to thousands in a matter of hours and majorly impact economic productivity. Public services must be accessible to all the residence because a failure to do so can effect every resident.



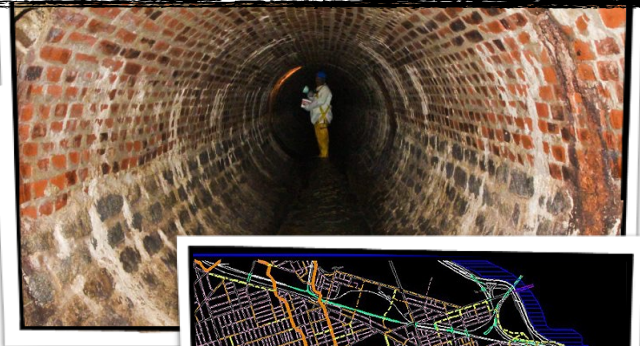
EMS & Hospitals



Power Grid

Philadelphia's Sewer Network

The density of urban centers allows for efficient and effective delivery of infrastructure and other services. When people are agglomerated, the shared benefit of proximity allows for better service to be provided to more people for less cost using fewer resources. The problem is that when cities expand or sprawl, the people begin to disperse across the landscape. The further away people live from the CBD, distance decay and friction of distance dramatically affect the accessibility, quality, cost, and environmental impacts of the services being provided. Using sanitation and sewers as an example, effective sanitation requires a large number of pipes to be effective. When people are densely packed together, fewer pipes and water treatment facilities are needed to service the population. As the urban space expands, more pipes, treatment plants, and long term maintenance are needed to keep up with the expansion. Similarly, a dense population justifies the installation of a large quantity of cell phone towers and internet wires. Dispersed populations away from the CBD struggle to meet the threshold needed for a cost-efficient communication infrastructure. Thus, these areas have limited cell phone signals and internet connectivity, disconnecting residents from the flow of goods and information on the global communication networks.



Businesses

The heart beat of the city is the Central Business District (CBD). While all of the other components of urban spaces are important, the CBD is truly the heartbeat that keeps the body alive. Given the people's dependence on salary income to meet basic needs, the modern city cannot survive without businesses to hire workers. There are two categories of businesses:



- **Basic.** Basic industries and companies sell products on a regional and global scale, bringing money and wealth from outside of the city into the city. It increases the city's GDP, giving the residents more wealth to spend on other items. Basic industries in the Research Triangle Region would include IBM, Red Hat and GlaxcoSmithKline. These companies make a product in RTP that they sell to people and businesses outside of RTP. This brings wealth from outside of RTP into the area, increasing the GDP and prosperity of the region. Just like lungs bring oxygen into the body, so to the Basic Industries bring wealth from outside the community into the local economy.
- **Non-Basic.** Non-Basic industries circulate wealth within the community. Tertiary services like local restaurants, car washes, and dry cleaners move the money around within the local economy.
Example:

A person who works at the dry cleaner takes the money he earns and eats lunch at the local restaurant. The dry cleaner business owner takes the money earned and pays for her car to be washed. The car wash girl goes to the hair salon to get her hair styled. The hair stylist takes the money he earned and takes his shirt to the dry cleaner.

Most of the money did not leave the community; instead it circulated around the community. Basic industries have a multiplier effect: 1 basic industry job creates 3-4 non-basic jobs.

Retail stores and tertiary sector businesses provide the goods and services residents need in the urban center. These businesses are the final destinations of a series of long, global supply chains that bring the final product to the customer to consume. The retail stores and services have to determine where they will setup their stores to reach the needed amount of customers while fending off competitors. Do they build their own building, lease a space in a strip mall or rent in a larger shopping mall? Where will be the best location to maximize their profitability or are there too few customers to keep them in business? Typically, they follow the population density and income per capita metrics.

Transportation

If businesses are the heart beat of the city, the transportation networks are the arteries and circulatory system. The success of an urban space is based on accessibility and connectivity within the city and between cities - a responsibility that solely relies on the transportation networks. The more ideas, goods, and people flow through the transportation networks, the more success the businesses will have, bringing greater prosperity to all. The inverse is also true - a failure in the transportation and communication networks could cost the city millions of dollars in revenue.

An urban area must have ways for people and goods to flow. Urban developers constantly evaluate the effectiveness of their transportation systems for congestion points and cost effectiveness. Following bid-rent theory, people need to get in and out of the Central Business District effectively, but any land used near the CBD is extremely expensive. When developing a transportation network, there are the cost considerations of: who will install the mode of transportation? Who will maintain the system? What energy is required? Does the demand for transportation meet the adequate threshold? What is the ability to expand the system?

Each system has its benefits and drawbacks:

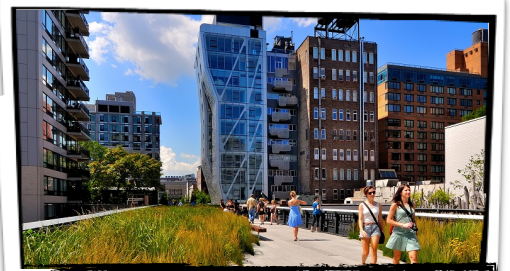
Private or Shared Transportation. Private transportation includes vehicles owned and operated by individual citizens for their own use or by businesses for a profit.

- **Walking.** Walking is cheap, human powered, healthful, and environmentally friendly. However, walking is slow, tiresome, and leaves a person exposed to the natural elements. People tend to only want to walk 15-20 minutes to their desired locations and are limited to bringing with them what they have the strength to carry. Thus, walking is an ineffective mode for transporting goods.
- **Bicycles.** Cheap, human powered, healthful, and environmentally friendly. Allows people to travel farther, faster than walking, carrying more goods. The cost of the bicycle is typically born by the rider, adding no extra cost to the government. Businesses have started to provide the service of bicycle sharing, where a person can rent a bicycle at a kiosk, ride to their destination and drop the bike off at the next available kiosk. Technology is allowing users to check out and pay for bikes and scooters by using their smartphone apps, indicating anywhere the bike may have been left. The user can just leave the bike at their next location when they are done.

On the downside, like walking, bicycles are still exposed to the elements. For bicycles to be truly effective and safe, there needs to be a bike lane to separate speedy cyclists from pedestrians and from speeding vehicles on the road. Bike lanes add costs for the government and annoyance/frustration to other drivers on the road. Finally, for bikes to be effective businesses and services must still be reasonably close to the place of residence. People will not want to bike more than 15-20 minutes to the places they are trying to go, especially in bad weather.

- **Automobiles.** Automobiles are fast, with a high capacity for carrying people and goods. Costs for a car are paid for by the individual owner or shared companies like the bicycles (think taxis, Uber, etc.). Autos carry more people and goods per trip, all while being protected from the elements. Cars have the route flexibility to take people where they want to go, when they want to go. This gives individuals personal control over their economic and recreational activities.

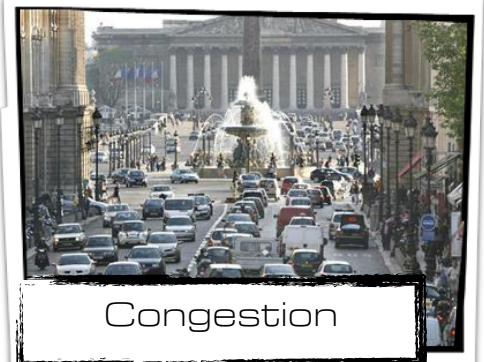
On the downside, automobiles represent a great cost to the user and to the



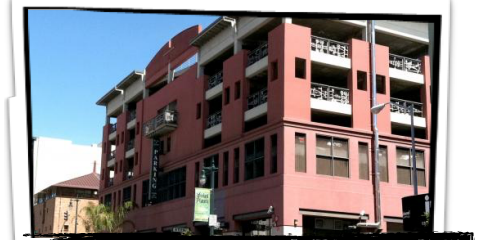
Walkable City Model



Bicycle Lanes



Congestion



Parking Garage



Accidents

State. Roads and highways are expensive and slow to build and constantly need maintenance. It is hard for states to keep up, which causes congestion and slows economic activity. Cars are expensive, meaning not every person has the ability to purchase one. As a result, communities with cars are able to access more: more economic opportunities, more resources, more housing options, more food options, more retail options... Those without cars must walk or use public transportation, drastically limiting their options and opportunities. This is especially true when cars are the main (or only) method of transportation to move about a city. Cars need a secure place to park, requiring the desired destination to have parking lots or garages. A conservative price estimate is that one parking space costs \$10,000-\$20,000 to create. Cars require gasoline, which requires access to oil supply chains. They create air and noise pollution. Each car is driven by an amateur who makes decisions for their own benefit. This creates very risky situations that cause a large number of crashes, burdening the health care and police infrastructures.

Public Transportation. Public transportation is owned and operated by the government using tax payer dollars.

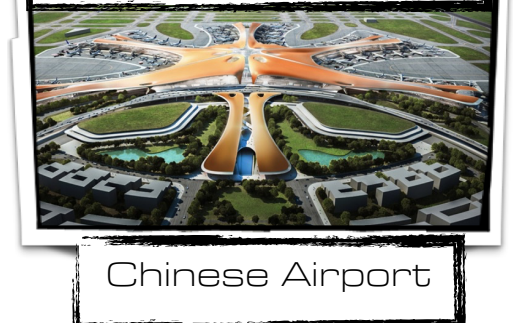
- Bus. Bus routes allow people a fast way to move around town that is protected from the elements. With more people riding per vehicle, it reduces road traffic. The cost to the riders is relatively cheap, because of the agglomeration. Drivers are professionals, with specialized training and a CDL license. There is also less need for parking spaces, allowing more effective land use.

On the downside, buses require roads and gasoline and operate on a timetable. The government also has to pay for the busses themselves, along with drivers, garages, maintenance, gas, etc. Typically, the government tax dollars fund the bulk of the cost of city bus networks. The riders have to wait for the bus to run their route, and it may be 5-25 minutes between times a bus comes to pick up at the terminal or stop. The bus may not drop off at a point that is close to where the person's destination is, extending travel time. When a society transitions to cars, fewer people ride the bus. This makes it difficult to achieve the threshold to keep the bus network running by reducing the economies of scale, causing ticket prices to increase. Both have a disproportionate impact on the low income communities who rely on the buses for their mobility.

- Rail. Trains (subways, commuter light rail) follow similar principles as buses, being able to carry large numbers of people on per trip. Rail lines do not compete with roads, thus reducing traffic congestion and the total number of cars on the road. Many cities have public rail that costs \$1-3 per trip around the city and can be utilized by riders of all social classes. They can even be put above ground (monorails) or underground (subways), using comparatively minimal land as compared to roads and parking spaces. Trains are very fuel efficient, with some types of rail being able to run on the electrical grids; proving to be environmentally friendly.

On the downside, railways are fixed, with no ability to change direction or route. If the needs of the community change, it is costly to change and adapt (especially subways). Customers have finite options of where they can get off, having to plan their journey to walk from the train station to their final destination. Similar to buses, the cost is born by mainly the government and tax dollars. This includes hiring and training specially certified train operators and maintenance crews. If there is not the appropriate threshold of users in the community, the costs can be extremely burdensome to a city. This is especially worrisome in car-based cities, where most people already own a private vehicle - with little incentive to ALSO ride trains.

- Seaports. Great for trading massive quantities of goods internationally for a cheap price. Provides excellent economic opportunities, if positioned well. Can be utilized with tourism for cruise ships or other site seeing opportunities.



On the downside, sea travel is a very expensive endeavor that is initially paid for by public funds. Travel is slow and subject to the weather conditions, making it not very useful for transportation of people as a part of daily commutes (unless they are commuting between islands). Ships can be used to get from one part of the coast to another, but they cannot get people to specific inland locations. Once the person is on land at their destination port, the person will need to plan how to get from the seaport to their final destination. Also, ships heavily pollute the air and water.

- Airports. Airports have the ability to move large groups of people and goods, very far distances, extremely fast. Airplanes are a safe form of travel with minimal traffic and delays compared to driving. Much of the cost of airplane ownership and maintenance is born by private companies instead of by public government agencies.

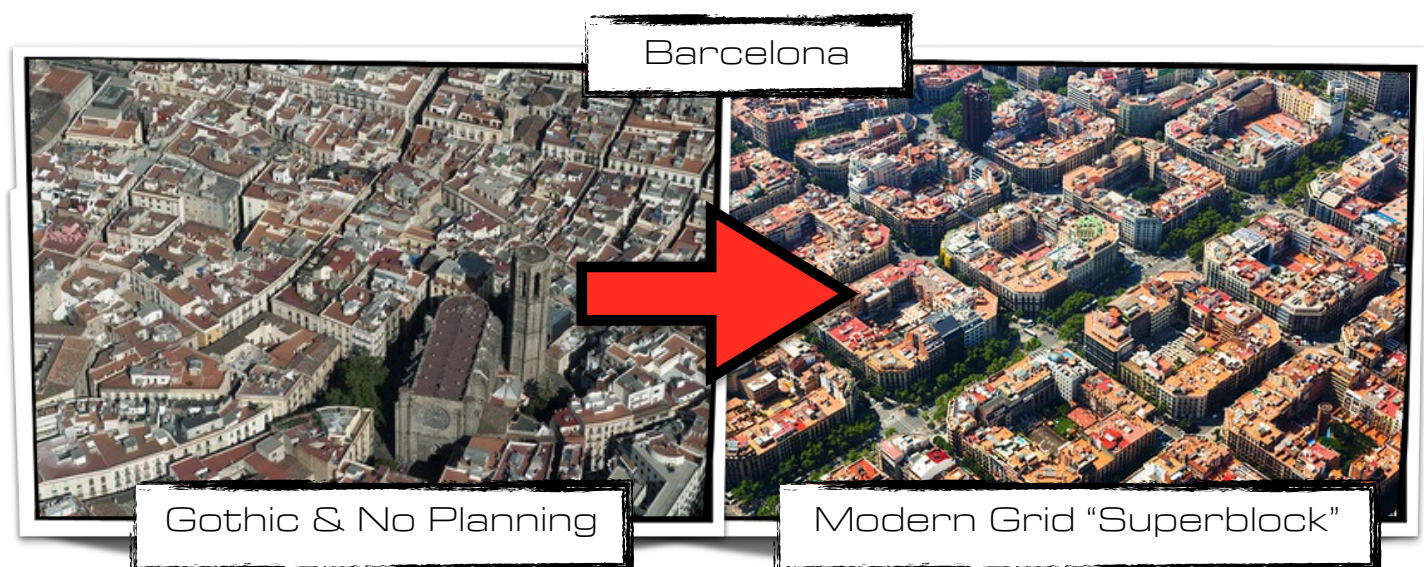
Airports have many downsides, the first being the inefficiency of local transport. While airports are great for long distances, their terminal and route costs are very high for short distances. Airports need a very high threshold of customers to be profitable, which means governments must plan for one airport to service a large range of clients. Once at the final destination, people need to plan a second form of transportation to get to their final destination. Airports tend to be located 40-70 minutes of driving outside the city center because they occupy such a large amount of land. Airplanes require specialized crew who are trained to fly the aircraft, control the flow of air traffic, maintain the fleet, etc. These jobs require degrees, certifications, and years of training (especially the pilots). A plane ticket is quite costly for consumers, allowing only the rich to utilize air travel - especially on a regular basis.

Communication Systems

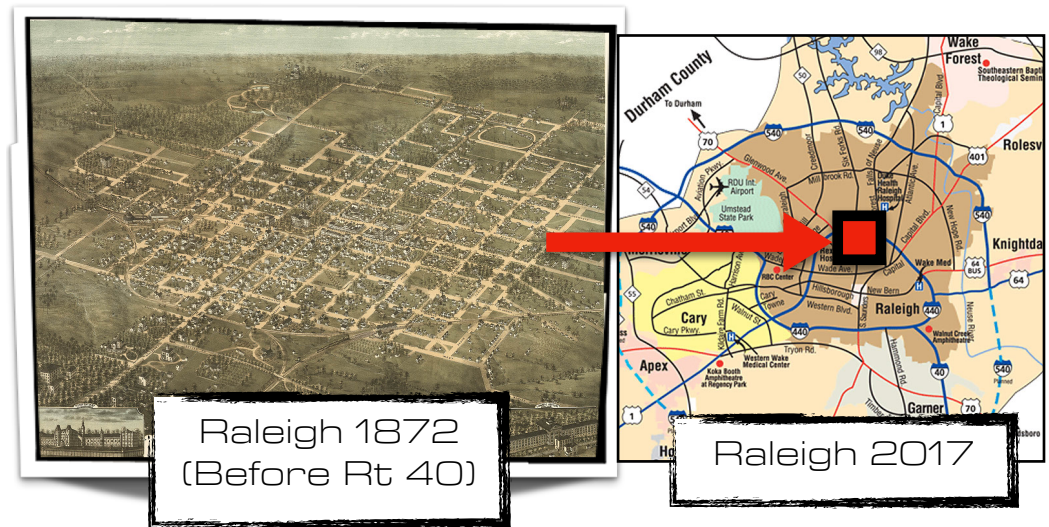
Communication systems allow people to communicate across the city and beyond. Communication is the central nervous system of humanity - sending and receiving messages to create action through the body. Communication systems include telephone land line and cell phone service, internet access, TV access, and the postal/delivery services. Excellent communication is vital to run functional businesses and local services in every aspect of society.

Government

The city government is the brain of the urban space. While the heart beat and arteries give life, the brain brings order and direction. The first area the government is responsible for is land use, determined through *city planning* and *zoning* to organize the use of land: the location of transportation networks, the layout and composition of residential and mixed use neighborhoods, and land acquisition and permission for electrical and sewer lines, etc. Will the roads be planned in a grid, triangles, radial patterns, or no pattern at all? Cities have a huge level of control over which segments of the environment should be protected and which can be utilized for improving the economy. Cities can also designate areas as historic districts to be preserved, or can give encouragement/incentives to *gentrify*, or redevelop older less used areas.



City governments also have the task of incentivizing business growth and development. Economic growth is directly tied to urban growth. Thus, urban planners and city governments use tools to maximize their growth potential. The use of single and mixed use zoning promises the incentives of prime locations and the benefits of agglomeration. *Tax breaks* and *subsidies* are used to convince businesses that this location will provide them the least cost. Cities can also provide incentives via infrastructure and utilities. The greater the financial burden the city government takes on, the more enticing the location becomes to businesses. Research Triangle Park was a public-private partnership between the business community and the government to create a “business park” that incentivized research institutions relocating to the Raleigh-Durham area. The use of tax incentives and the promise to build an international airport close to RTP, plus allowing businesses to partner with public university professors on business projects, began to draw major technology and medical companies to the area - turning the RTP Metropolitan Area into one of the fastest growing regions in the USA since 1990.



The city government has the responsibility of understanding and supporting its population. The residents have needs that can and should be met through agglomerating in urban settings. The elected (or in case of a *unitary government* - selected) officials use census data and population pyramids to gain quantitative data about the demographic trends of their city. They also use surveys and polls to gain qualitative data about the thoughts, opinions, and desires of their resident population. With the quantitative and qualitative data, governments can budget tax money to provide services that meet local needs. The services a local or regional government can provide are: education, transportation, EMS, fire fighters, parks, greenways, recreation services, housing, trash/recycling, bike lanes, libraries, etc.

B. Functions of Urban Spaces

In the modern economy, cities serve a unique purpose in the global division of labor. Because of industrialization, mass transportation, and rapid communication, major urban centers have begun to specialize in one or two functions within the global economy. All the associated infrastructure and services within the urban center are designed to support those functions, seeking to create an agglomeration of associated support businesses. The more businesses agglomerate, the lower cost of business and the better the businesses will be able to maximize their profit. The agglomeration of businesses and other services leads to the urban center being a *growth pull* to the region. All urban centers must fight to stay relevant and thriving in the global economy, or else they will shrink or collapse.

The functions of most urban centers can be generally organized into one of the following categories. Large cities, metropolitan areas, and megalopolises will serve multiple functions, and thus could fit into many of these categories:

- **Primary Resource Centers.** Areas focused on the primary and secondary sector activities that remove resources from the earth and the bulk-loss factories that manipulate them into functional parts and pieces. Examples: Abu Dhabi, UAE and Houston, Texas, USA are centered on oil extraction and refinement. Quesnel and Vancouver, British Columbia, Canada are primary resource centers for forestry and paper mills. Santiago, Chile is funded by commodities exporting, with a specialty in copper.



- **Commercial Centers.** These areas serve as the corporate headquarters for major institutions. From these centers companies control transportation and communication networks, cultural production, media outlets, and coordinate with complimentary institutions. Examples: New York City (USA), Los Angeles (USA), Venice (Italy), Tokyo (Japan), Toronto (Canada)
- **Financial Centers.** Areas that are focused on banking, insurance, stock exchanges, and related services. Examples: London (UK), New York City (USA), Singapore, Hong Kong (China), Shanghai (China), Tokyo (Japan) are cities whose economies center on financial industries and are home to the world's most important stock exchanges and banks.
- **Industrial/Manufacturing Centers.** Cities built for the purpose of producing goods to be distributed regionally and globally. Detroit, Michigan built their city around car manufacturing. Beijing, Tianjin, and Guangzhou are major Chinese cities built around manufacturing textiles and electronics. Shenzhen, China went from “non-existent” to 12 million people between 1980-2020 because of its manufacturing focus for electronic hardware. In Europe, Frankfurt, Germany and the northern Italian cities are built around manufacturing steel, cars, and advanced parts.
- **Gateway Centers.** Gateway cities are the entry and exit points for a State and are the places where goods leave and enter. These areas take part in the transportation and distribution of goods and services for the global market. Gateway Centers have a specialized infrastructure of machines, warehouses, and uniquely designed roads and railways that allow the mass transportation of billions of tons of goods each year. This would be best exemplified at port cities where goods move from freight ships to freight trains or trucks. Examples: Hong Kong and Guangzhou in the Pearl River Delta and Shanghai along the Yangtze River Delta in China are the busiest gateway regions in the world. The city-state of Singapore and Kuala Lumpur, Malaysia manage the third busiest gateway in the Strait of Malacca. Long Beach, California and New York City, New York are the two largest gateways into the USA. Others: Miami, FL (USA), Tijuana (Mexico).
- **Terminals Centers.** These areas are similar to gateway cities, in that they serve as important transition points within the global transportation network. They are situated at important intersections, creating key break-in-bulk points that transition goods from one form of transportation to the next most cost effective method. In Europe and Asia, there are important train stations where key rail lines intersect; allowing people and goods to move from one train line to another. Airports make use of terminal cities in their business model. Airlines establish two to three key hubs around a continent. Airlines use small aircraft to take people from their smaller local airports, to the larger regional hubs, then connect back to the smaller airports.
- **Innovation Centers.** These spaces specialize in research and development. Major advancements in technology stem from these spaces, both for commercial and military use. Examples: Seoul (S. Korea), Silicon Valley, CA (USA), Research Triangle, NC (USA), Austin, TX (USA).



Abu Dhabi, UAE



Hong Kong



Toronto, Canada



Long Beach, California



Singapore

- **Political Centers.** These urban areas hold the seat of power for a region or state and tend to be capital cities, serving as home to executive, legislative, and judicial services. The political power tends to agglomerate legal, commercial, and financial corporations wishing to have ease of access to powerful policy makers. Examples: Washington, DC (USA), London (UK), Paris (France)
- **Religious Centers.** Areas that hold important religious buildings or holy sites, including locations of important supernatural events, tombs of pious individuals, or administrative headquarters of powerful religious figures in the faith's hierarchy. While the city may have other important functions, they are agglomerated in that urban center because of the locations religious significance. Examples: Jerusalem is a city with religious sites important to the Jewish, Christian, and Islamic faiths. Mecca is the birth place of Islam and is home to the Kaaba that all Muslims must make a pilgrimage to during their lifetime. Vatican City is a city-state that is the headquarters of the Pope and other prominent Cardinals who govern the Catholic-Christian faith. Varanasi (also known as Kashi) is considered by many to be the spiritual capital of India, being of religious significance to Hinduism, Buddhism and Jainism.
- **Education Centers.** The modern economy needs high skilled workers who are forged and trained through a state's university system. In these colleges, many of the brightest minds in each field of study impart their knowledge and skills to the next generation of great minds. Universities also serve as important research centers for businesses, government, and military institutions, seeking to advance the breadth and depth of knowledge on issues critical to the region. Education centers are cities built around key these critical universities, serving as the economic heartbeat for that urban area. Examples: Palo Alto, California is home to Stanford University. Ann Arbor, Michigan is built around the University of Michigan. Athens, Ohio exists solely because of Ohio University in the hills of Appalachia, where no other profitable employer exists for 90 miles in any direction. Cambridge, Massachusetts is the home of MIT and Harvard. Universities can be the chief employers and economic driving forces in a region. Each of these urban areas would vanish or severely diminish if the university were to disappear.
- **Resort Centers.** These areas are built around tourism industries and exist for the vacationing pleasure of its customers. Some urban areas leverage their natural resources to promote ecotourism. Others manufacture an experience, such as a theme park, sports teams, or gambling casinos. Examples: Las Vegas, Nevada is built around casinos, hotels, and entertainment experiences. Disney World (Florida), Myrtle Beach (South Carolina), Atlantic City (New Jersey), Marseille (France), Capri (Italy) and Santa Barbara (California) exist as resorts and entertainment regions.
- **Retirement Centers.** Growing in number in DTM Stage 5 states, affluent communities pay to maximize services and comfort amenities while living out their golden years. Impoverished communities have minimal services and are reliant on public programs like Social Security. Examples: Tampa, Florida and Sun City, Arizona



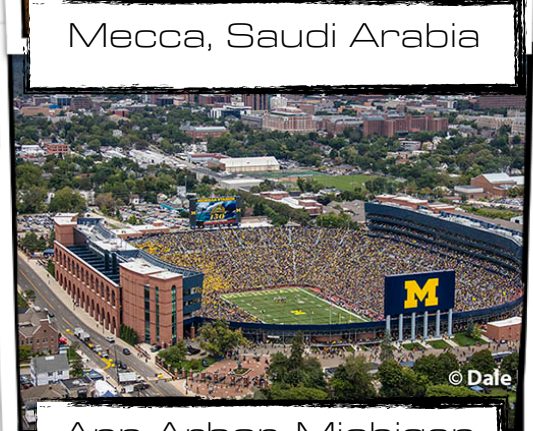
Washington, DC



Vatican City



Mecca, Saudi Arabia



Ann Arbor, Michigan



Marseille, France