Central Place Theory

WALTER CHRISTALLER
1893–1969

Introduction

- **Central Place Theory (CPT)** is a spatial theory in urban geography and regional planning that seeks to explain the number, size, and location of human settlements in an urban system.
- The theory was proposed by **Walter Christaller**, a German geographer, in **1933** in his book *"Die zentralen Orte in Süddeutschland" (The Central Places in Southern Germany)*.
- **Christaller** observed that **s**ettlements exist to provide goods and services to their surrounding populations, leading to a hierarchical pattern.

Objectives

Central place theory attempted to illustrate-

I. How settlements locate in relation to one another?

II. The amount of market area of a central place.

III. Why some central places function as hamlets, villages, towns or cities?

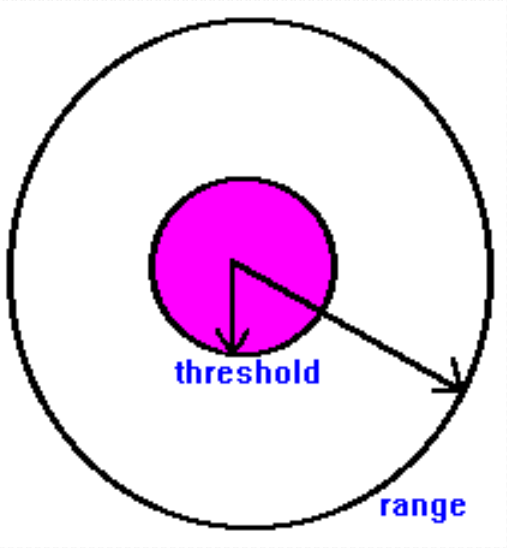
- Attempted to explain the spatial arrangement, size, and number of settlements (central places).
- Focused on the provision of goods and services from central locations to surrounding areas (hinterlands).
- Attempted to design a model that would show how and where central places in the urban hierarchy would be functionally and spatially distributed.

Terminologies related to CPT

- **Central Place:** A settlement (city, town, village) that provides goods and services to its own population and to the population of the surrounding area.
- Higher-order central places offer more specialized services.
- **Centrality** refers to the functional importance of a settlement, determined by the number and types of goods and services it provides to its surrounding areas. It is not solely based on its population size, but rather its ability to attract people from other settlements to utilize its specialized functions.
- **Hinterland** refers to the area surrounding a central place from which consumers are drawn

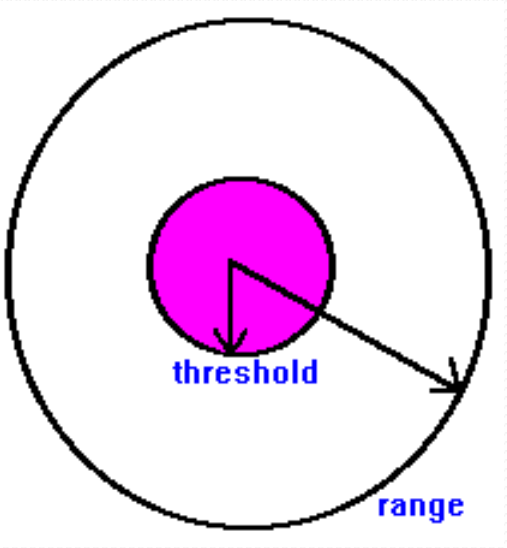
Threshold

- The minimum population or market size required to make the sale of a particular good or service economically viable.
- Low-order goods (e.g., bread, milk) have low thresholds.
- High-order goods (e.g., specialized medical services, luxury cars) have high thresholds.



Range

- The maximum distance consumers are willing to travel to purchase a good or service.
- Beyond this distance, the cost or inconvenience outweighs the need for the good, or an alternative, nearer central place becomes available.
- Low-order goods have small ranges; high-order goods have large ranges.



Assumptions of the Theory

- Christaller made several simplifying assumptions to build his theoretical model:
  - **Isotropic Plain:** An unbounded, flat, homogeneous surface with no physical barriers (e.g., mountains, rivers).
  - **Evenly Distributed Population:** Population is uniformly spread across the plain.
  - **Evenly Distributed Resources:** Resources are available everywhere without concentration.
  - **Uniform Purchasing Power & Demand:** All consumers have similar income levels, purchasing power, and demand for goods and services.

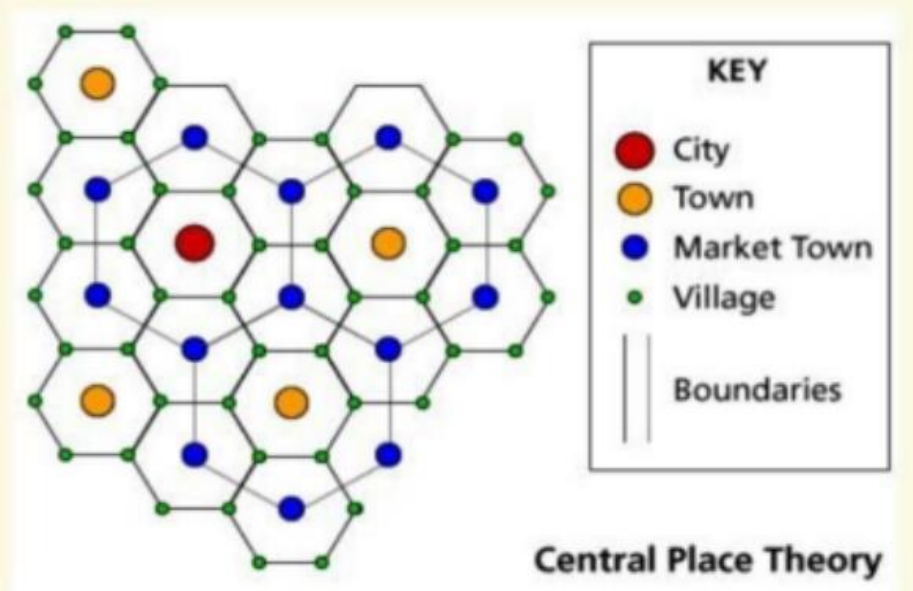
Assumptions of the Theory

- **Rational Consumer Behavior:** Consumers will always choose the nearest central place offering the desired good or service to minimize travel distance and cost.
- **Perfect Competition:** No excess profits; sellers aim to maximize profits, and consumers aim to minimize costs.
- **Single Means of Transport:** Transportation costs are equal in all directions and directly proportional to distance.
- **Hexagonal Market Areas:** To avoid unserved areas or overlaps, market areas are shaped as hexagons.

Hierarchy of settlement

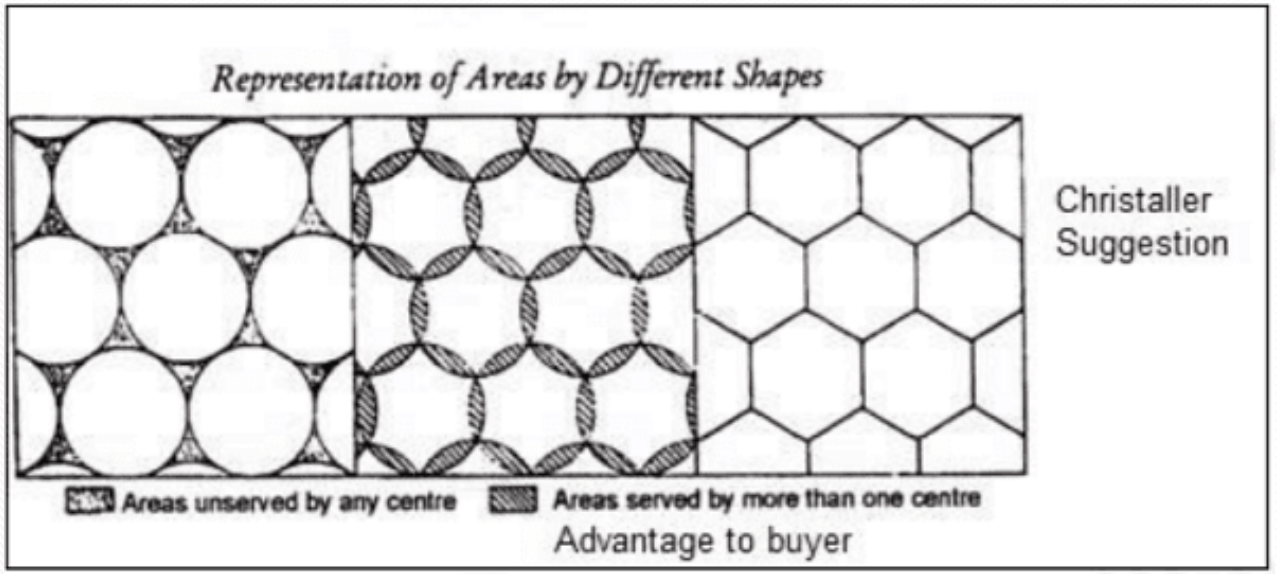
- Hamlet:-fewest goods and services available.
- Village- includes the region of hamlet and some aqdditional goods andd services.

- Town- includes the region of village, hamlet and provide some additional goods and services.
- City- includes the region of village, hamlet, town and provide some additional goods and services.



Shape of central places

- Christaller proposed that the **most efficient shape** for market areas is a **hexagon**.
- This avoids overlaps and gaps, unlike circles or squares.
- Each central place serves its **hexagonal hinterland**, minimizing distance and maximizing efficiency.



Three principles in CPT

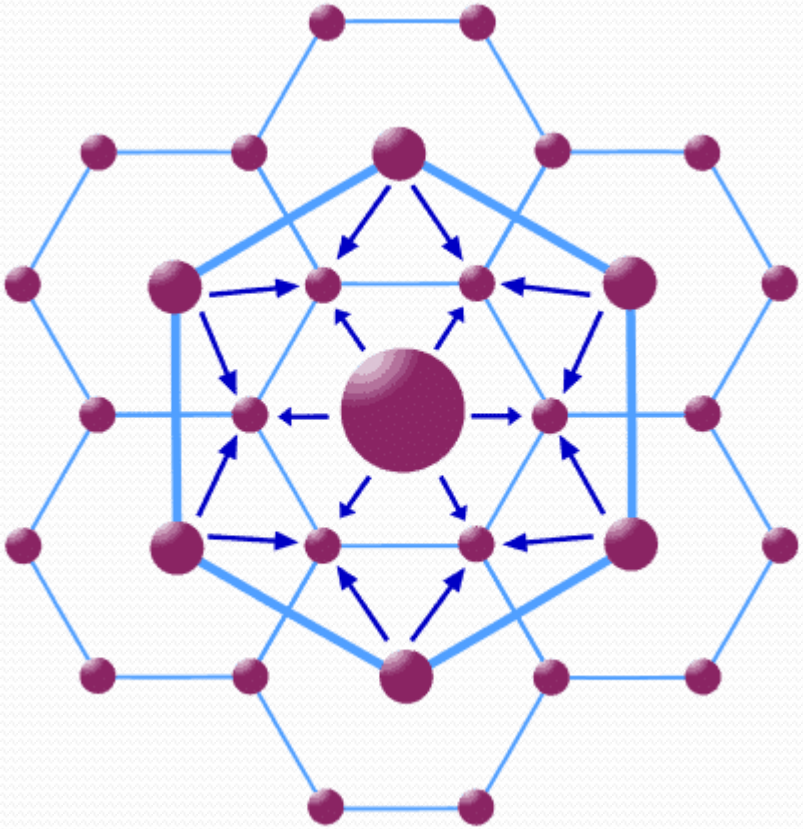
Christaller identified three main principles governing the arrangement of central places, each represented by a "K-value" (K-constant). The K-value indicates how many lower-order central places (or parts of their market areas) are served by a higher-order central place.

- The Market Principle (K=3)
- The Transport Principle (K=4)
- The Administrative Principle (K=7)

Marketing Principle (K=3)

- **Concept:** Maximizes the number of central places served by a higher-order center.
- Each higher-order central place serves its own market area plus one-third of the market area of six surrounding lower-order centers (1 + 6 * 1/3 = 3).
- Results in a hierarchy where the number of settlements at each decreasing level increases by a factor of three (e.g., 1 city, 3 towns, 9 villages).
- Most efficient for consumers in terms of access to goods.

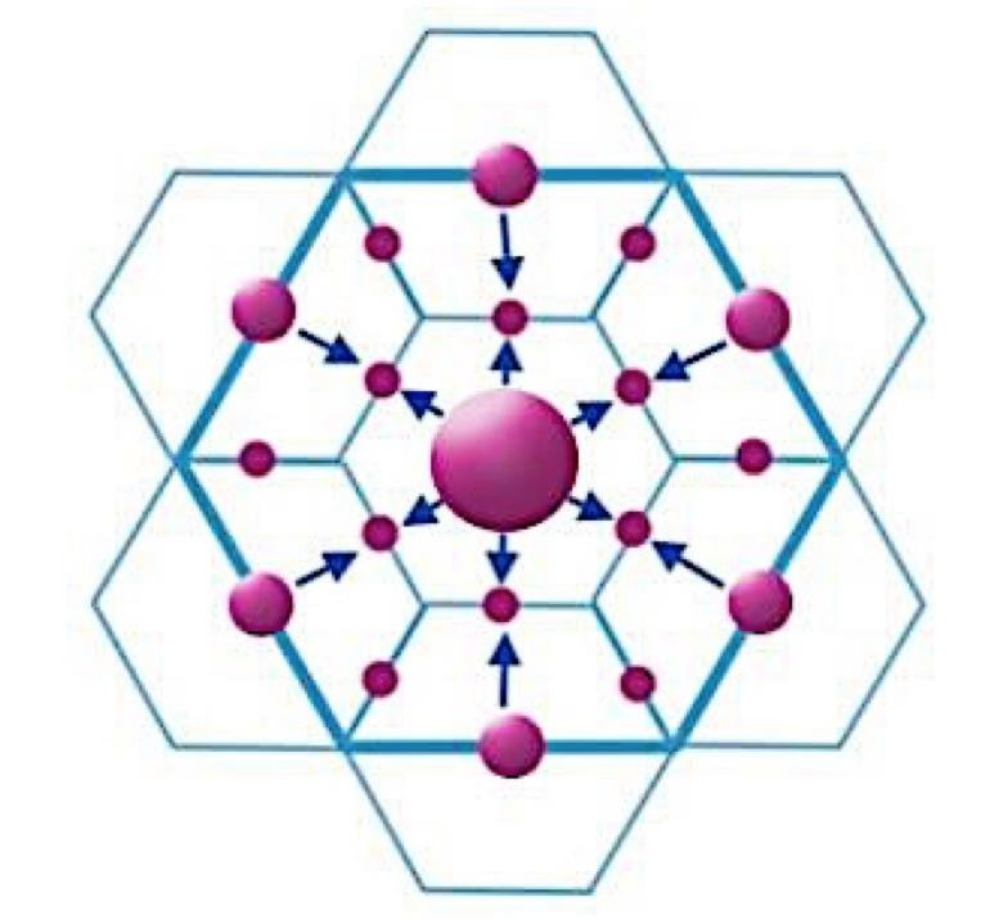
Marketing Principle (K=3)



Transport Principle (K=4)

- **Concept:** Maximizes the number of central places located on main transportation routes.
- Lower-order centers are located at the midpoint of each side of the hexagon of the higher-order center.
- Each higher-order central place serves its own market area plus half of the market area of six surrounding lower-order centers (1 + 6 * 1/2 = 4).
- Favors efficient transportation and minimizes the length of roads connecting centers.
- Results in a hierarchy where the number of settlements at each decreasing level increases by a factor of four (e.g., 1 city, 4 towns, 16 villages).

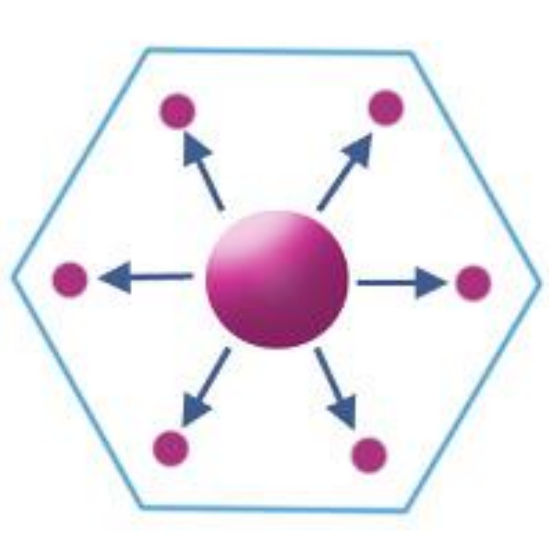
Transport Principle (K=4)



Administrative Principle (K=7)

- **Concept:** Ensures that all lower-order central places are entirely within the market area of a single higher-order central place for administrative control.
- Each higher-order central place completely encompasses the market areas of six surrounding lower-order centers, plus its own (1 + 6 * 1 = 7).
- Results in a hierarchy where the number of settlements at each decreasing level increases by a factor of seven (e.g., 1 city, 7 towns, 49 villages).
- Most efficient for administrative organization and governance.

Administrative Principle (K=7)



Strengths of Central Place Theory

- **Pioneering Work:** One of the first theories to explain the spatial distribution and hierarchy of settlements.
- **Predictive Power:** Provides a framework for understanding why settlements are located and sized the way they are.
- **Identifies Key Concepts:** Introduced fundamental concepts like threshold, range, and hierarchy, which are still relevant in urban geography.
- **Influential in Planning:** Has been used as a guideline for regional planning and retail location analysis (e.g., post-WWII Germany, Nordoostpolder in the Netherlands).
- **Explains Economic Functions:** Effectively describes the location of trade and service activities.

Applications of CPT

- **Retail Location Planning:** Businesses use CPT principles to decide where to locate stores based on threshold population and consumer range.
- **Urban and Regional Planning:** Helps planners understand the functional relationships between settlements and design efficient service provision networks.
- **Public Service Provision:** Useful for optimizing the location of public facilities like schools, hospitals, and emergency services.
- **Understanding Settlement Systems:** Provides a foundational understanding of how urban systems are structured and interact.
- **Demographic Analysis:** Used to analyze population distribution, urbanization trends, and regional development.

Limitations of Central Place Theory

- Assumes a **flat and featureless landscape** – unrealistic.
- Ignores **topography, rivers, mountains, etc.**
- Population is **not evenly distributed** in reality.
- People may **not always go to the nearest center**.
- Impact of **modern transportation and internet** is ignored.
- Fails to consider **political, historical, and cultural factors**.

Models are not real, but they help us to understand reality.