

Research Paper

Urban agglomeration: An evolving concept of an emerging phenomenon

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HIGHLIGHTS

- 32,231 urban agglomeration related literature identified.
- Major viewpoints of urban agglomeration definitions summarized.
- Tentative theoretical framework for defining urban agglomeration proposed.
- Empirical examples of China's urban agglomeration presented.

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ABSTRACT

Urban agglomeration is a highly developed spatial form of integrated cities. It occurs when the relationships among cities shift from mainly competition to both competition and cooperation. Cities are highly integrated within an urban agglomeration, which renders the agglomeration one of the most important carriers for global economic development. Studies on urban agglomerations have increased in recent decades. In the research community, a consensus with regard to what an urban agglomeration is, how an urban agglomeration is delineated in geographic space, what efficient models for urban agglomeration management are, etc. is not reached. The current review examines 32,231 urban agglomeration-related works from the past 120 years in an attempt to provide a theoretically supported and practically based definition of urban agglomeration. In addition, through this extensive literature review and fieldwork in China, the current research identifies the four stages of an urban agglomeration's spatial expansion and further proposes operable approaches and standards to define urban agglomerations. The study aims to provide a scientifically sound basis for the healthy and sustainable development of urban agglomerations.

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1. Introduction

Cities are the central locations for capital, labor and information. They have long attracted the attention of researchers from a wide variety of disciplines. The development, spatial evolution and spatial organization of urban forms are major research themes in the urban studies and human geography communities. Studies on the spatial clustering of cities began as early as the 1920s, with various terms used to describe this particular urban spatial organization. These terms include megalopolis, urban agglomeration,

city group, and city cluster. Studies on urban agglomeration have increased over the past three decades (Fig. 1). A detailed search with these terms (megalopolis, urban agglomeration, city group, and city cluster) in the Web of Science database (up until July 8, 2015) renders 32,231 academic entries that are related to this specific urban spatial organization. Chronologically, there is only 1 study found in 1922; this number increased to 10 in 1952, 72 in 1980, and 146 in 1990, and the number exploded to an astonishing 5488 in 2000, 20,278 in 2010, and 32,231 as of 2015. Using an extensive literature review and cross-referencing, this study attempts to explore the central themes of studies on the spatial clustering of cities (this study specifically terms it “urban agglomeration” to indicate the inherently integrated characteristics of this city cluster), hence proposing a both scientifically sound and manageable approach to sufficiently define and effectively identify urban agglomerations.

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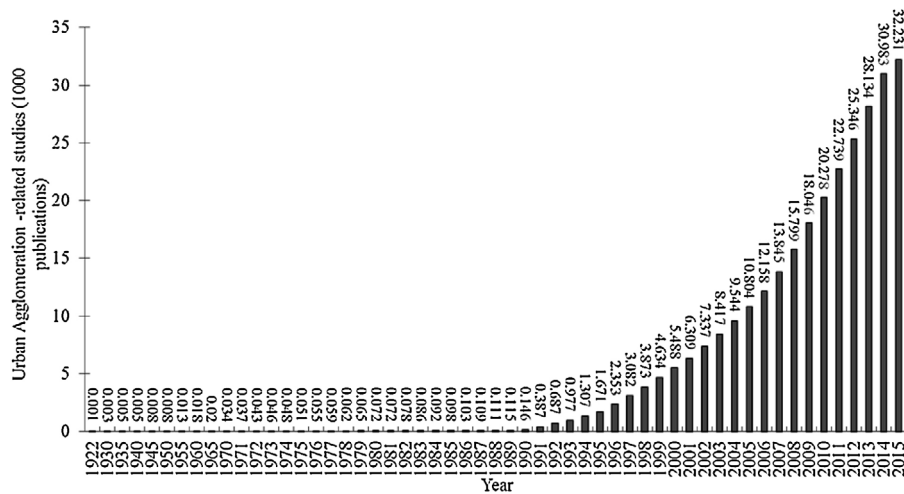


Fig. 1. Number of urban agglomeration-related research articles in the past 50 years.

2. The definition of urban agglomeration

2.1. The conceptions of urban agglomeration

As early as 1898, the British urban scholar, pioneer of modern urban planning and social activist Ebenezer Howard proposed the concept of the “town cluster” in his book *Garden Cities of Tomorrow* (Ebenezer, 1902). This concept deviated from the then popular spatial focus on cities themselves. Howard attempted to study as an integrated entity the spatial organization and internal dynamics between cities and their surrounding countryside. In his vision of the urbanized landscape, the urban form is not only the areas occupied by cities but also an area comprising several peripheral *Garden Cities* integrated with a *Central City*. This concept eventually evolved into the early forms of the “Garden City” model of urban agglomeration.

In 1915, the British sociologist and humanist urban planner Patrick Geddes published his *Cities in Evolution*, based on his research on cities in the United Kingdom (Geddes, 1915). Geddes was among the first scholars to employ a comprehensive regionalization approach to exploring the internal dynamics of cities and the process of urbanization. He observed the co-existence of urban sprawl and the over-concentration of both cities and industrial and economic activities. Geddes further argued that urban sprawl was a result of over-separation between cities and their suburban areas, whereas over-concentration was a result of the concentrated locations’ having apparent resource advantages (such as coal) and transportation conveniences (such as intersections among railways, highways, and waterways). Geddes regarded such a concentration of urbanization and collective human activities as a new form of population development. He predicted that this conurbation/urban cluster would be the future trend of urbanization development. In his analyses, he also identified seven concentrated urban areas and one London urban cluster in the United Kingdom. During this same period, newly emerging urban clusters could be identified in the Greater Paris region of France, the Berlin–Ruhr region of Germany, the Pittsburg–Chicago region of the United States and the Greater New York region of the United States (Geddes, 1915).

In 1918, the Finnish urban scholar E. Saarinen proposed the theory of organic decentralization, which regarded cities as “organic entities,” in his work *The City – Its Growth, Its Decay, Its Future* (Lin & Chen, 2003). Saarinen suggested that the development of cities should follow the order from chaotic concentration to ordered decentralization. The Greater Helsinki Master Plan was based on

this theory. Similar master plans started to appear in various countries, suggesting that studies on urban clusters were attracting increasing attention.

In 1920, scholars in the former Soviet Union also proposed a variety of concepts to describe the clustering of cities that was similar to urban agglomeration. These concepts included the urban economic zone, the economic city, and the planned area. Scholars such as Bogelade also studied the urbanization and clustering process in Ukraine. These researchers proposed a set of indicators, including the minimum amount of population in the central city, the minimum number of peripheral residential locations, and the distance from the central city to the edge of the cluster, to identify spatial extension and forms of urban agglomerations (Liu, 2003).

In 1931, Fawcett (1932) argued that a conurbation, as proposed by Geddes (1915), is a place of continuous urban areas that are not separated by rural lands. The British Census Bureau coined the expression “Aggregates of Local Authority Area,” which defined urban agglomeration/conurbation. This concept was very similar to the “Metropolitan Regions,” as in the US census, “urban area,” as in New Zealand, and “population agglomérée,” as in France. All of these terms referred to a concentration of urbanized areas that had a higher concentration of population, urban functions and urban landscape.

In 1933, the German geographer W. Christaller proposed the Central Place Theory, which for the first time systematically defined the spatial organization and structure of a conurbation/urban agglomeration (Lin & Chen, 2003). This theory not only established the foundation for urban studies but also evolved to be the fundamental theory for regional development and analysis.

In 1939, M. Jefferson and G.K. Zipf studied the scale and spatial distribution of urban agglomerations. Zipf was also the first to introduce the gravity model to spatially analyze interactions among different urban agglomerations (Lin & Chen, 2003).

In 1957, the geographer Gottmann (1957) published his study *Megalopolis: The Urbanization of the Northeastern Seaboard of the United States*, based on his work on urban areas and their spatial expansions in the United States. The term “megalopolis” was coined and clearly articulated. Gottmann further argued that the future direction of urbanization was the development and formation of megalopolises that gradually merged with nearby urban regions. Gottmann was regarded as the primary contributor to the study of urban agglomerations. Specifically, in his book, Gottmann clearly articulated that the cities in the northeastern US were conveniently developed along major highways, railways and other main transportation lines. These cities were often highly connected,

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