ARL ACADEMY FOR TERRITORIAL DEVELOPMENT IN THE LEIBNIZ ASSOCIATION

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Agglomeration, agglomeration area

URN: 0156-55990259

This is a translation of the following entry:

Bentlage, Michael; Thierstein, Alain (2018): Agglomeration. Agglomerationsraum. In: ARL – Akademie für Raumforschung und Landesplanung (Hrsg.): Handwörterbuch der Stadt- und Raumentwicklung. Hannover, 37-48.

The original version can be accessed here:
urn:nbn:de:0156-5599045

Typesetting and layout: ProLinguo GmbH
Translation and proofreading: ProLinguo GmbH

Leibniz Association

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Contents

The term agglomeration describes a densification of firms, the population, infrastructure and thus of interactions between them. Agglomeration offers spatial proximity to other stakeholders and frequently leads to a positive cumulative causation. Due to the growing importance of a knowledge-based economy, the interplay of spatial and relational proximity is becoming increasingly relevant. Ultimately, the significance and function of agglomerations can be better understood in relation to each other.

1 Introduction

Agglomeration means densification, accumulation and concentration. From a spatial perspective, an agglomeration can be described as a local densification that comprises a certain concentration of people, infrastructures and institutions. Depending on the specific disciplinary focus, the term agglomeration has various dimensions: morphological, functional, social, political and institutional, relational or in regard to spatial transformation. The terms *agglomeration, metropolitan area* and *urban region* describe similar but certainly not identical situations. Distinct from the concept of agglomeration, metropolitan area refers to a morphological densification of a population in settlement structures in residential and economic areas. The term ▷ *Urban region* outlines the functional coherence of a given space, in terms of economic relations, utilities, etc.; a common indicator are the interactional patterns of commuters. Given these overlapping concepts, agglomerations can be defined in various ways.

Spinatsch (2005: 26) distinguishes five characteristics of definitions of agglomerations:

- legal: the basis for a regime of subsidies
- political: an expression of intent for horizontal cooperation between territorial authorities (▷ *Territorial authority*)
- problem-related: a spatial bracket for traffic and transport or central local issues/problems
- functional: commuters, the linking of value chains, employment
- spatial: coherent settlement area, morphology.

Traditionally, two approaches to defining and delimiting an agglomeration prevail: the functional-analytical definition and the morphological-spatial definition. An overview of selected definitions used in Europe illustrates these two approaches.

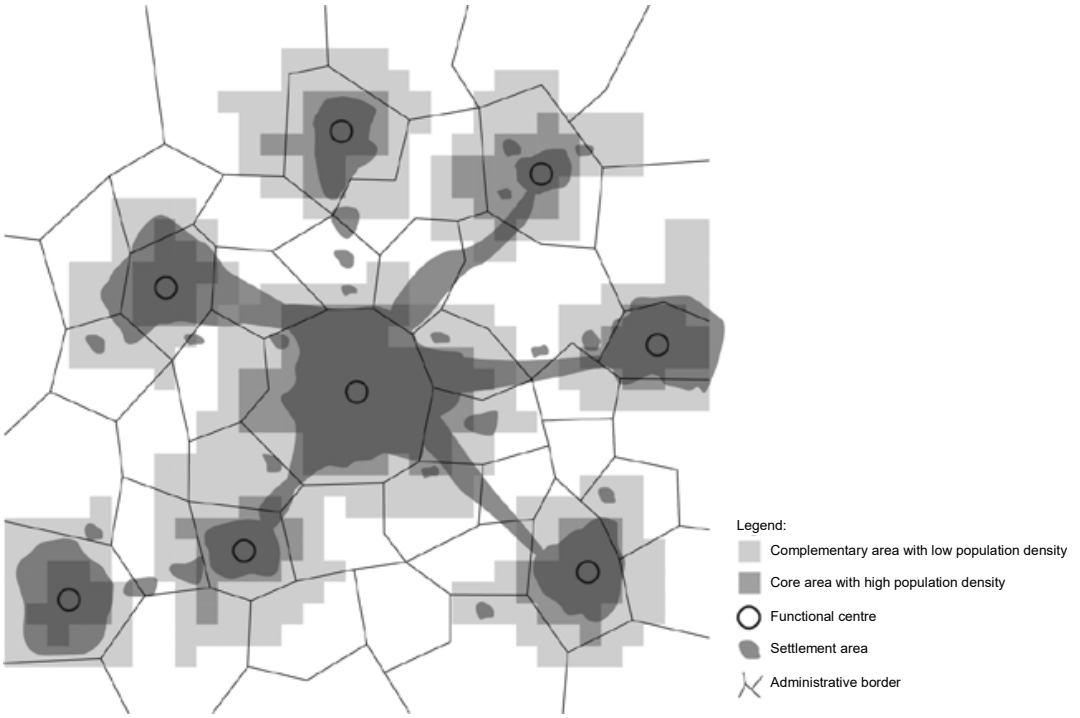
2 Common definitions of agglomeration

Various approaches to defining and delimiting agglomerations are used in European countries. These definitions always combine attributes of size, interaction and morphology and are characterised in their specific scope by the urbanisation patterns prevalent in the country concerned. Figure 1 shows a schematic illustration of the criteria used by these approaches to delimit agglomeration areas based on central place functions (▷ *Central place*), degrees of density (▷ *Density*) and morphological settlement structure (▷ *Settlement/settlement structure*) (Goebel/Kohler 2014; Dijkstra/Poelmann 2014).

At the European level, functional urban areas (FUA) are manifestations of functional interactions. In simple terms, FUA defines the labour market regions and regional interactions of the morphological urban spaces in Europe. The labour market regions of the FUA are derived principally from commuters and the corresponding threshold values for commuters into and out of the FUA (ESPON 2006a). At the centre of a further evolution of this approach, morphological urban spaces are used as an approximation of functional urban spaces to allow a uniform definition to

be elaborated, which can then be used – unlike the earlier ESPON study – irrespective of national differences and existing definitions (ESPON 2006b).

Figure 1: Schematic illustration of approaches to delimiting agglomeration areas



Source: The authors

EUROSTAT, the statistical office of the European Union, relies on the NUTS regions (Nomenclature of Territorial Units for Statistics), which essentially serve to determine eligibility for funding under the Structural Fund Regulation. The NUTS 2 level (government districts) and NUTS 3 level (cities and districts) as well as the next lower level, LAU 1 (local administrative unit), are of particular interest in the context of defining agglomerations. EUROSTAT traces the development of urban areas through ▷ *Monitoring* . This 'urban audit' is based on three spatial units currently defined as follows (EUROSTAT 2012; Dijkstra/Poelmann 2014):

- *The core city* as a local administrative unit (LAU), where the majority of the population lives in an urban core with at least 50,000 inhabitants. This definition relies on the European spatial classification LAU 2, formerly NUTS 5.
- The *larger urban zone* (LUZ), which is based on the commuter catchment area interlinked with the core city. This is based on the regionalisation according to LAU 1, previously NUTS 3.
- The *urban region* (greater city) converges with the core city, which extends, through interactions, far beyond the political-administrative borders of the municipality.

In Germany, various approaches are being used simultaneously: (1) the agglomeration and urbanised areas, (2) the urban region, (3) the central areas and (4) the densely populated areas. All

approaches are defined and used by the Federal Institute for Research on Building, Urban Affairs and Spatial Development *(Bundesinstitut für Bau-, Stadt- und Raumforschung, BBSR)* (*BBSR* 2014; Milbert/Krischausky/Burgdorf et al. 2012). These definitions are 'essentially based on the concept of "urban regions" developed by Olaf Boustedt in the 1950s and the evolution of this term in the 1970s' (*BBSR* 2016). Other spatial delimitations of agglomerations focus, among other things, on commuter movements as the basis for labour markets (Kropp/Schwengler 2011, 2008; ▷ *Labour market*) or on regional relocation patterns, which provide information on the shape of housing markets (Rusche 2009; ▷ *Housing market*).

In 2014, Switzerland introduced a new definition for spaces with an urban character. Due to progressing ▷ *Urbanisation*, the increasing expansion and significance of functional spaces as well as changes in the availability of data (Switzerland dispensed with the population census from 2000), it became necessary to thoroughly revise the existing definition of urban areas in Switzerland (Goebel/Kohler 2014). The fundamental structure of the definition is matrix-based and includes both morphological and functional criteria. Thus, the Swiss definition aligns with those of other European countries, in particular Austria (Wonka/Laburda 2010), France (INSEE 2011), EUROSTAT and the European Commission (Dijkstra/Poelmann 2014). The Swiss approach consists essentially of two basic steps: (1) Structurally coherent core zones are identified based on a density criterion, such as inhabitants per km^2, and thresholds for absolute values, such as the number of inhabitants. In so doing, the number of inhabitants and employees as well as equivalents for overnight stays were used as reference values in Switzerland. (2) Spaces that are functionally dependent on those core areas are then defined based on the indicator of commuter interaction (Goebel/Kohler 2014).

The delimitations, definitions and typologies described herein have different objectives. Public administrative responsibilities, funding regimes, spatial observation and, in individual cases, other analytical interests give rise to this occasionally confusing diversity of spatial concepts. Thus, the concepts of agglomeration and agglomeration area are in a state of constant flux depending on the particular focus in question and how the concept is intended to be used. Transparent explanations of presumed impacts, expected changes and objectives are the cornerstones of spatial development policy (▷ *Spatial development*). The following section will trace the evolution of the concept of agglomeration.

3 The concept of agglomeration in transition

Discussions of the concept of agglomeration and agglomeration area have expanded and seen a shift of emphasis in recent years. During the 2000s, a relational perspective was introduced in ▷ *Spatial sciences*, particularly in economic geography (Dicken/Malmberg 2001; Graham/Healey 1999; Bathelt/Glückler 2002). In the context of agglomeration, relational means that a place should be analysed not only by reference to its structure and existing properties. A given location – an agglomeration, in this case – is always engaged in an exchange or interaction with other places (Parr 1973: 195 et seq.). The actors in these relationships are businesses, public institutions and individuals. This approach becomes interesting if agglomeration is discussed not only as an existing entity of a certain size, but also in connection with its role and function in the transformation of spaces.

Reflecting on the concept of agglomeration and agglomeration area also means determining which structuring criteria should be selected in order to be able to distinguish the agglomeration area from the rest of the space. In addition, current discussions also turn on identifying relational criteria that can contribute to the understanding of the transformation of agglomerations over time. Agglomerations change their internal structure as well as their importance and role in relation to each other. These structural changes are driven by urbanisation and stronger spatial interactions through the division of labour and ▷ *Mobility*.

Urbanisation had a particularly space-transforming impact during the Industrial Revolution. Traditional commercial locations as well as newly established industrial cities expanded beyond their original cores. More cost-efficient mobility infrastructures make it possible to establish residential areas and jobs at growing distances from the urban core. This led to ▷ *Suburbanisation* and peri-urbanisation. These overlapping processes have been continuing for decades. Agglomeration areas as an urban phenomenon show a high level of consistency and durability. The analysis of agglomerations is gaining in significance. Human activities become more specialised and localised across dispersed spaces; they also combine with each other – for example, as a value chain of companies to create functional-spatial innovation and production systems (Asheim/Gertler 2005; Thierstein/Lüthi/Kruse et al. 2008). Pain (2008) proposes in this regard the notion of 'decentralised concentration' to describe a development process in which economic activities concentrate in a few locations whilst also spreading spatially (Pain 2008: 1163; cf. also Brake/Danielzyk/Karsten et al. 1997; *ORL* 1973; Rotach 1973). Agglomerations can gain or lose significance in such spatially anchored commercial and business networks. The ongoing structural financial constraints of public budgets also indicate that although agglomeration areas offer certain advantages in many cases, the associated responsibilities for providing the public services expected for a wider surrounding area are increasingly frequently under pressure.

Why are agglomerations able to prevail as centres of gravity in a constantly changing ▷ *Space* ? To answer this question, economic processes must be seen as combinations of activities, which are mutually entwined by both physical and non-physical flows in a network. Figure 2 illustrates this interplay of agglomeration effects and networks. The growing importance of interconnected activities has given rise, in turn, to new ideas regarding space, place and size, which cover both agglomerations and 'agglomerations of agglomerations' – so-called polycentric metropolitan areas – as discontinuous, mutually interrelated spaces (▷ *Polycentricity*; ▷ *Metropolitan region*).

Agglomerations change for various reasons: population growth; increasing land take, spatial connections created by ▷ *Transport infrastructure* and other infrastructures; and changes in economic services and production. A specialised economy based on the division of labour develops not merely from agrarian-manual to industrial mass production. Today, a rapid change towards a science-driven economic framework is apparent, both in regard to high-quality ▷ *Services* and in the research-intensive, producing economy (▷ *Knowledge society*). Miniaturised information and telecommunications technology is nowadays considered cost-effective and is ubiquitously available. Many places are losing their traditional locational advantages. Unlike these 'field-levelling' technologies, the knowledge economy appears to strengthen the significance of certain agglomeration areas (Alderson/ Beckfield/Sprague-Jones 2010; Lüthi/Thierstein/Bentlage 2013).

The reason for this phenomenon lies in the functional logic of the knowledge economy: for strategic reasons, businesses with multiple locations tend to select locations that offer the best access to highly skilled employees, competing companies, academic institutions, the

relevant markets and which have good accessibility in transport terms. If a sufficient number of manufacturers and service providers follow the same logic in selecting their location, this results in a spatially decentralised concentration of high-value functions (▷ *Choice of location*). However, not all statistically defined agglomerations benefit to the same extent. In the long term, it is not individual agglomerations that have an advantage, but those multi-polar areas of excellence that have sufficient density, diversity and a level of quality of people, institutions and infrastructures. In particular, a qualified, experienced and motivated workforce is a scarce 'commodity' not only in Europe; the 'war for talents' is also unfolding on an international level. A lack of qualified and motivated human capital becomes a critical factor that can limit development. Agglomerations are generally preferred in such competitions, but within a network of urban hubs, their ranking becomes steeper, even in a decentralised, federally-organised body politic such as Germany.

4 From a positional to a relational view of agglomeration

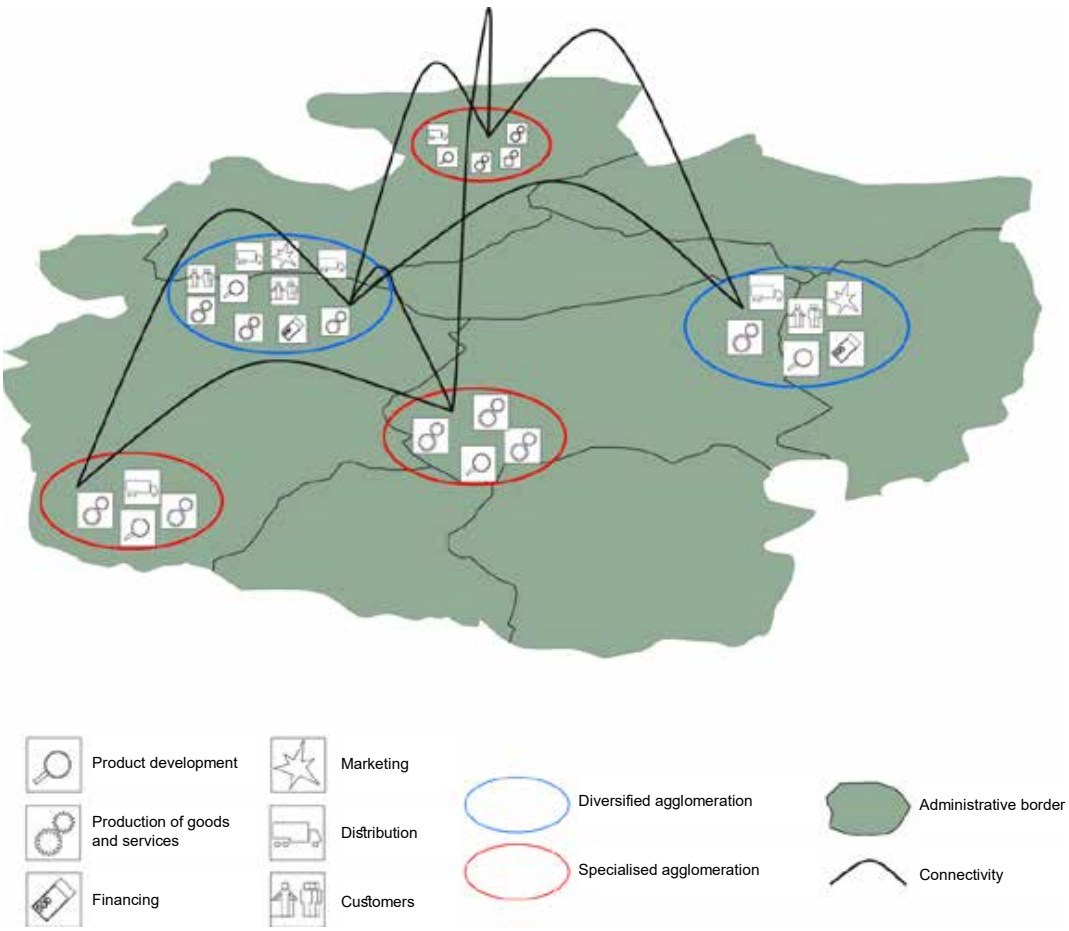
In the spatial sciences, the notion of agglomeration has long been an object of conceptual and empirical analysis. The theoretical analysis of agglomerations and their resulting benefits has a long tradition. The effects of the spatial establishment of businesses have been a focus of interest at least from the time of industrialisation and the increasing division of labour (Marshall 1930). This interest extends far beyond the analysis of existing structures. Positive forces and functions are ascribed to agglomerations: the advantages of agglomerations or positive externalities. The fundamental argument of agglomeration economies is based on the assumption that spatial proximity to economic partners and competitors has a positive impact on innovation and the acquisition of knowledge. This 'knowledge spillover' is the decisive factor for the spatial clustering of economic activities. At the same time, there is a controversial debate around whether a high degree of specialisation or rather diversification is the greater driver of economic power and growth (Beaudry/Schiffauerova 2009; Parr 2002).

The advantages of agglomeration are divided into localisation advantages and urbanisation advantages. Marshall (1930, 1947) and Hoover (1937) introduced positive externalities in the form of expansion effects, which arise through the concentration of specialised activities at certain locations, i.e. 'localisation advantages', which result in an increase in productivity over time. A second group of advantages of agglomeration areas are known as urbanisation advantages. These arise through the growth in size of locations, likewise lead to productivity advances and are characterised by a series of 'proximity advantages': the density and diversity of high-quality goods and services, higher density of demand, urban infrastructures, and short distances. Jacobs (1969) pointed out such urbanisation advantages; the analysis has since then expanded from the initially inner-city context to the agglomeration area (Dicken/Lloyd 1990; Feldman 2000; Parr 2014). The analysis of agglomeration – its nature, range of impact, and as a driver of change – is therefore inseparably linked to these localisation and urbanisation advantages. According to Rosenthal and Strange (2003), the advantages of agglomeration affect three different dimensions. First, there is the immediate spatial surroundings, which allow for direct and spontaneous contact with other stakeholders. The second dimension comprises the range of impact of urban ▷ *Infrastructure*, such as educational facilities or transport systems, that have an impact at the level of labour markets or commuter areas. Third, agglomerations are integrated in superordinate, spatial-functional systems and are subject to external influences (Rosenthal/Strange 2003: 387 et seq.).

With the emergence of cost-effective and powerful ▷ *Information and communication technology* (ICT) towards the end of the 20th century, the debate regarding the effects of spatial proximity was expanded to include the notion of relational proximity. The long-prevailing positional analysis – with localisation and urbanisation advantages – was supplemented by another group of advantages of agglomeration, in particular coordination activities, which can also be understood as networking activities (Parr 2002: 718). Around the turn of the millennium, a structural economic transformation occurred, which has made knowledge an ever more important resource (Florida 2007; Kujath/Schmidt 2010). This illustrates the interplay between endogenous and exogenous forces. Castells (2000) argues that although ICT has the potential to disseminate information over long distances, economic activities are concentrated in central hubs, such as New York or London (Sassen 1991; Castells 2000). The reason for this phenomenon is that the production of knowledge and the acquisition of knowledge are often based on experience. This knowledge is not codified and transferable through instruction; it is 'intangible' and gained through observation and informal exchanges (Polanyi 1966; Gertler 2003). Hence, the advantages of agglomeration are a complex phenomenon that changes significantly over time (Sassen 2001: 34 et seq.).

The term 'network economies' nowadays describes these more intensive and spatially more extensive relationships based on exchange. Thus, diversification and specialisation are closely related, because when knowledge is further deepened and specialised, it must afterwards be integrated into other value chains and requires places that can absorb and process this complexity (▷ *Networks, social and organisational*). Figure 2 illustrates the interplay between specialised and diversified agglomerations. Agglomeration in this context is understood here as a functional structure that houses various value chain activities. Connectivity indicates the extent of the exchange-based relationships between these spaces (Sokol 2011: 67 et seq.). The spatial structure created by the clustering of these activities differs from the administrative borders of territorial authorities. This gives rise to the notion of the relational development of multi-polar urban areas of expertise, where agglomerations play an important role (Lüthi/Thierstein/Bentlage 2013; Bathelt/Glückler 2011).

Figure 2: Agglomerations in the interplay between diversification, specialisation and connectivity



Source: The authors

More recent analyses address this interplay between spatial and relational proximity (Amin/Thrift 1992; Bathelt/Malmberg/Maskell 2004; Bentlage 2014). While agglomerations offer the advantage of spatial proximity, access to networks enables relational proximity. If the positional and relational perspective is considered as an interplay of functional and spatial logic, then agglomerations can be understood as interdependent hubs in the network of an urban system, each with demarcated territories – the agglomeration area (Amin/Thrift 1992; Parr 1973; Dicken/Kelly/Olds et al. 2001; Growe/Blotevogel 2011). Examples of these interactions are trade relations, transport and traffic systems, in-house company networks within multi-branch businesses or external interlinked value chains. Thus, agglomerations are nowadays recognised as a spatial configuration, which develops from the interplay of spatial and relational proximity (Bentlage 2014: 82).

How can this understanding of agglomeration and agglomeration areas be elucidated beyond a definition for statistical purposes? The relational perspective makes it possible to make a

more profound argument about the role and evolution of agglomerations. The interconnectivity perspective focuses on the explanatory power of the added value which a location can only gain through the exchange-based relationships with suitable partners. Functional urban spaces develop through (new) employment opportunities that create value, enable income and investments and which are, therefore, attractive for newcomers, in particular businesses, start-ups and the workforce along the entire spectrum of skills. In contrast with the territorial state, the functional city, thus defined, does not enjoy any autonomy that could be defended by force if need be. Cities and agglomerations conduct trade and are accessible for people and ideas to evolve into open, interconnected systems.

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Last update of the references: January 2018