

# eTopoi **Journal for Ancient Studies**

Special Volume 7 (2020): Political and Economic Interaction on the Edge of Early Empires, ed. by David A. Warburton, pp. 48–55.

DOI: 10.17169/refubium-28209

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## Central Place and Central Flow

Edited by Gerd Graßhoff and Michael Meyer,  
Excellence Cluster Topoi, Berlin

eTopoi ISSN 2192-2608

<http://journal.topoi.org>



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## Central Place and Central Flow

This chapter presents the idea of integrating central place and central flow theory in order to gain a deeper understanding of economic interactions, ranging from the local to the supra-regional scale. Central place theory is suitable to describe the local exchange relationships between settlements and their hinterland. Central flow theory puts forward the idea of cooperation of specific agents. These agents create new work due to the substitution of imports; an inter-settlement interaction between these agents creates a network of good- and information exchange. Hence, both concepts should be regarded as complementary since they describe two important aspects of the characteristics of places: the relationships to their hinterland and the integration of its people into networks of exchange.

central place theory; central flow theory; hinterland; jacobs; world-city-network

Dieser Beitrag versucht die Theorie der Zentralen Orte und die *central flow theory* zu integrieren. Ziel ist ein tieferes Verständnis der wirtschaftlichen Wechselwirkungen, von der lokalen bis zur überregionalen Skala. Die Zentralort-Theorie eignet sich zur Beschreibung lokaler Austauschbeziehungen zwischen Siedlungen und ihrem Hinterland. Im Zentrum der *central flow theory* steht die Idee der Zusammenarbeit spezifischer Akteure. Diese Agenten schaffen durch Substitution von Importen neue Arbeit, ihre Interaktion schafft ein Netzwerk des Waren- und Informationsaustauschs. Zentrale Orte und *central flow theory* sind als komplementär anzusehen, da sie zwei wichtige Eigenschaften von Orten beschreiben: die Beziehungen zu ihrem Hinterland und die Integration ihrer Menschen in Austauschnetze.

Theorie der Zentralen Orte; *central flow theory*; Hinterland; Jacobs; *world-city* Netzwerk

### I Central Place Theory

Central Place Theory was developed in order to understand the laws and principles that determine the number, size, and distribution of villages, towns, and cities.<sup>1</sup> A central place is a location that has a surplus of meaning in comparison to its surroundings. The relative surplus of meaning, i.e. its centrality, is based on the goods and services offered by a central place; these distinguish it from the hinterland, i.e. its complementary region.<sup>2</sup> Central place theory describes a process, i.e., a flow of people from the hinterland to the town to access public goods or buy private goods, which are collectively “central goods”<sup>3</sup> Goods and services vary in terms of their importance from ordinary, very common, daily goods to very specific, very rare, ones. The different orders of goods and services on offer at each level of the various community agglomerations create a spatial hierarchy of central places, distributed across a vast landscape dominated by agricultural villages, producing and exchanging very ordinary goods at local markets; it is in the central places that the central goods are found.<sup>4</sup>

1 Christaller 1968, foreword.

2 Christaller 1968, 28–30.

3 Taylor 2012 describes this as a “town-ness” process.

4 Christaller 1968, 26, 65–72.

This deductive theory is fundamentally economic and based on competition for space.<sup>5</sup> The spatial pattern of places, derived from the theoretical assumptions, shows a perfect supply of places with goods and services of all hierarchical levels, with the distribution determined by a balance of maximal spatial extent bounded by minimal transport costs.<sup>6</sup> Hence, central place theory focuses on the socio-economic organization of an area and the optimal supply of the places that belong to it.

To assess the centrality of a place one has to know its central functions (central institutions).<sup>7</sup> Christaller developed a catalogue of these for the socio-economic conditions of the early 20th century.<sup>8</sup> Christaller conducted an empirical assessment of his theory and drew law-like statements concerning settlement distribution.<sup>9</sup> These show that the market principle (perfect supply dictated by minimal transport costs) determines the spatial organization of settlements – at least in Southern Germany in the early 20th century.<sup>10</sup>

For a centrality assessment in historical times, Denecke<sup>11</sup> developed a catalogue of ten central functions that on the one hand indicate the centrality of places – mainly in medieval Europe – and that on the other are accessible to the methods of historical sciences.<sup>12</sup> In an archaeological, especially prehistoric archaeological context, the evidently fragmentary nature of the source material obstructs a detailed assessment of centrality. Notwithstanding, Gringmuth-Dallmer<sup>13</sup> defined five central functions that allow an assessment of a place's centrality, enabling a recognition of its position in a regional hierarchy of places, while at the same time taking account of the fragmentary nature of the source material.<sup>14</sup>

## 2 Central Place Theory – the need for more

Due to its basic assumptions and its focus on the supply of a local and regionally scaled hinterland, central place theory cannot serve to describe economic processes that are non-local and based on the interaction between different places. Where an exchange of goods is not aimed to supply and support a place's hinterland, central place theory fails.<sup>15</sup> These kinds of interactions are typically *urban*, causing the special role of cities in a network of places. As stated by Jacobs:

A city does not grow by trading only with a rural hinterland. A city seems always to have implied a group of cities, in trade with one another. A [...] creative city economy could actually be sustained [...] if several little cities were simultaneously serving as expanding markets for one another.<sup>16</sup>

5 Pacione 2009, 125.

6 Christaller 1968, 77–79.

7 Christaller 1968, 139–140.

8 See Christaller 1968; though Christaller created this catalogue he did not use it due to difficulties in acquiring all the necessary data and due to the non-unique character of different categories (Christaller 1968, 146).

9 Christaller 1968, 252.

10 Christaller 1968, 252; Christaller also derived two other principles, the traffic, and the administrative principle. For him, these are just exceptions and mirror a forced adaption of spatial patterns to external influences, like important historical trade routes or environmental/topographic constraints, cf. Christaller 1968, 253–254.

11 Denecke 1972.

12 Denecke 1972, 43.

13 Gringmuth-Dallmer 1996.

14 Gringmuth-Dallmer 1996, 8.

15 “Town-ness is a local affair and thus is inherently non-dynamic as an economic process” (Taylor, Hoyler, and Verbruggen 2010, 2811).

16 Jacobs 1970, 34.

### 3 The missing half: city-ness and Central Flow Theory

There is another process operating that leads to the patterns of economy and settlements we are observing and aiming to understand. Taylor et al.<sup>17</sup> called it *city-ness* and it is the core of their central flow theory that is about “[...] bringing the non-local into an urban place to create a cosmopolitan mix of peoples, commodities and ideas”.<sup>18</sup> City-ness process describes the creation of *new work* due to *import substitution* that leads to a more complex division of labor and becomes the basis for economic expansion in city networks.<sup>19</sup>

Central place theory is about settlement patterns resulting from an economy in an equilibrium state. In contrast, central flow theory focuses on flows within and transforming such patterns. It is interested in the network characteristics of places and interprets the spatial organization of economic development as a space of flows.<sup>20</sup> Central flow theory focuses on the people within places and their individual interest: “[...] cities do not replace imports, firms [= people] in cities do”.<sup>21</sup> Today, the interaction of these people with shared interests in different places constitutes the world city network.<sup>22</sup>

### 4 Complementarity

To understand a settlement pattern, with places of high and of low importance, with differences in size and location, we need to integrate aspects from central place and central flow theory. Both theories complement each other (fig. 1). Central place theory describes hierarchies of places, central flow theory describes their interactions, i.e. their constituted and constituting network. Central place theory gives sense to the hinterland of a place, since it is the area supported by it. A hinterland is limited by the range of goods supplied by the central place. In contrast, central flow theory is not bound to a hinterland. Due to its focus on exchange between people it is unbounded in space and only limited by the availability of partners to interact with. In central place theory, places compete with one another, seeking a more economic supply of their hinterland, what enables them to enlarge it. In contrast, people acting in terms of central flow theory do interact and hence devise cooperation between places to enhance their own profits.

As should be obvious, both theories complement each other and we need to investigate them together in order to understand the spatial structure of our research objects, whether these are territories, cities, villages, industries, or individual people.

Although the theories were formulated for modern conditions, they might also be applicable in historical and archaeological contexts. The reason is the fundamental difference between place and space, between settlements and flows, between the local and (supra-)regional – i.e., aspects of central place and central flow theory. Jacobs’ epigenetic theory of cities aims to illustrate this in a diachronic perspective. It commences with the

[...] idea that a city grows by a process of gradual diversification and differentiation of its economy, starting from little or nothing more than its initial export work and the suppliers to that work. [...] [C]ities radically differ in their growth processes from inert towns and from villages even when they are still as small as towns or villages.<sup>23</sup>

17 Taylor, Hoyler, and Verbruggen 2010.

18 Taylor, Hoyler, and Verbruggen 2010, 2812.

19 Jacobs 1970.

20 Castells 2010; Taylor, Hoyler, and Verbruggen 2010, 2813.

21 Taylor, Hoyler, and Verbruggen 2010, 2814.

22 Taylor 2004.

23 Jacobs 1970, 129.

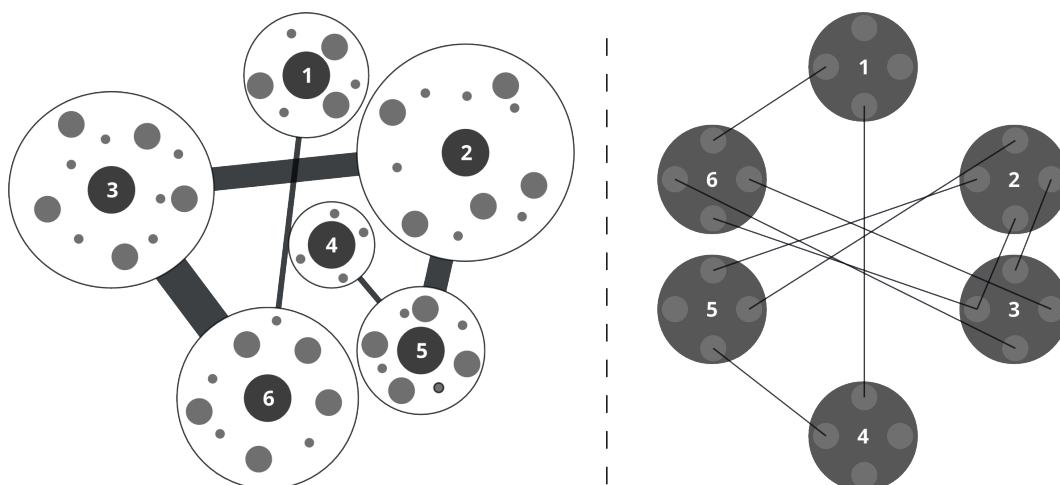


Fig. 1 | A pattern of places in light of central place and central flow theory; (left) numbered, black circles correspond to central places that serve the places (grey dots) in their respective hinterlands (white circles); the size of the hinterland, i.e. the region that is influenced by a central place, depends on the range of goods and services offered by the central place and the characteristics of its hinterland – this illustrates the central place aspect; the lines between the regions show the interactions between people in the various different central places – this illustrates the central flow aspect; (right) dark grey, numbered circles are central places; light grey circles are individual people/firms/agents in these central places; lines indicating the interaction between the different individuals; the strength of interaction between individuals in different central places does not depend on their importance in terms of central place theory.

Recent publications point to this special character of cities in contrast to towns or villages even in prehistoric periods.<sup>24</sup> The point Jacobs made is that specific agents have the power to influence a place's development due to their labor. Hence, it is always both, the place's spatial characteristics and its people's interactions, that shape a place and steers its development.

Recently, archaeologists criticized and rejected these views, because in their opinion they are based on old, out-dated (i.e., erroneous) data, and ignore current archaeological interpretations.<sup>25</sup> Although this disapproval is based on hard facts and necessary for the present scientific discourse, there is no reason to abandon these ideas in general since their main point, i.e. the importance of an integrated perspective of central place and central flow theory, is not disproved or falsified by these authors – they do not even discuss it. In contrast, there are other examples, such as Hohenberg & Hollen Lees, who show the integration of places and flows when they point out that already in historical times, in order to flourish, cities needed to interact with (a) their surroundings, (b) with one another, and (c) with larger sociopolitical units.<sup>26</sup>

Future studies are required to establish what modifications are necessary to render the joint use of the complementary theories useful. The following examples indicate that the integration of central place and central flow aspects are useful in order to understand spatial phenomena. They might be seen as a first step and alternative perspective, aiming to advance our understanding of the causes of specific forms of spatial organization:

1. The integration of local supply and network characteristics – i.e. central place and central flow theory – become obvious in the exchange network of obsidian from the Aegean island of Melos during the Neolithic and Early Bronze Age in Western Anatolia. The highest amounts of obsidian are present at settlements that are located

24 Soja 2001; Soja 2003; Soja 2010; Taylor 2012.

25 Smith, Ur, and Feinman 2014.

26 Hohenberg and Hollen Lees 1995, 4.

in areas of high suitability for local supply and at the same time have a suitable location in terms of exchange, due to the integration of maritime and terrestrial traffic or due to their position along terrestrial trading routes. The source area of obsidian – Melos – was not settled during that time, indicating that the exchange was organized by a specialized group of people that supplied only specific settlements.<sup>27</sup>

2. The patterns of interaction in Western Anatolia, from prehistory up to modern times, mirror the complementary character of central place and central flow theory on different spatial scales (assessed using central functions<sup>28</sup>): interactions of local to supra-regional importance shift between different settlements and regions during the centuries but are always at those locations where the relation of local supply and network characteristics is optimal. A change in this relation is always linked to a change in the settlement that concentrates the most interactions.<sup>29</sup>
3. The princely seats of central Europe during the Iron Age that functioned on the one hand as centres of local power and on the other as gateways, i.e. nodes in a communication network.<sup>30</sup>

One could find more examples, where it is necessary to integrate aspects of central place and central flow theory in order to understand the importance of a place. In general, it is the relation between functions of hinterland and network exchange. The first is linked to advantages in spatial location and leads to competition between places. The latter is based on the location in a network and needs the cooperation of specific agents in different places. Both aspects complement each other and the importance of a place is always the result of specific, interrelated aspects of central place and central flow theory. Thus, location is of relative importance.

27 For the Neolithic see Perlès, Takaoglu, and Gratuze 2011; for the Bronze Age see Knitter, Bergner, et al. 2012 and Horejs 2014.

28 Gringmuth-Dallmer 1996.

29 Knitter, Blum, et al. 2013; interactions and their concentration are seen as a measure for centrality, see Nakoinz 2012; Nakoinz 2013; as well as Knitter, Nakoinz, et al. 2014.

30 Nakoinz 2013.

## References

### Castells 2010

Manuel Castells. *The Rise of the Network Society: Volume I*. Oxford: Wiley-Blackwell, 2010.

### Christaller 1968

Walter Christaller. *Die Zentralen Orte in Süddeutschland – Eine ökonomisch-Geographische Untersuchung über die Gesetzmäßigkeiten der Verbreitung und Entwicklung der Siedlungen mit städtischer Funktion*. Darmstadt: Wissenschaftliche Buchgesellschaft, 1968.

### Denecke 1972

Dietrich Denecke. "Vor- und Frühformen der Europäischen Stadt im Mittelalter: Bericht über ein Symposium in Reinhausen bei Göttingen in der Zeit vom 18. bis 24. April 1972." In *Vor- und Frühformen der Europäischen Stadt im Mittelalter: Bericht über ein Symposium in Reinhausen bei Göttingen in der Zeit vom 18. bis 24. April 1972*. Ed. by H. Jankuhn, W. Schlesinger, and H. Steuer. Abhandlungen der Akademie der Wissenschaften in Göttingen 3. Göttingen: Vandenhoeck & Ruprecht, 1972, 33–55.

### Gringmuth-Dallmer 1996

Eike Gringmuth-Dallmer. "Kulturlandschaftsmuster und Siedlungssysteme". *Siedlungsforschung* 14 (1996), 7–31.

### Hohenberg and Hollen Lees 1995

Paul M. Hohenberg and Lynn Hollen Lees. *The Making of Urban Europe, 1000–1994*. Cambridge, Mass: Harvard University Press, 1995.

### Horejs 2014

Barbara Horejs. "Proto-Urbanisation Without Urban Centres? A Model of Transformation for the Izmir Region in the 4th Millennium BC." In *Western Anatolia Before Troy. Proto-Urbanisation in 4th Millennium BC?* Ed. by B. Horejs and M. Mehofer. Symposium Proceedings 1. Vienna: OREA, 2014, 15–41.

### Jacobs 1970

Jane Jacobs. *The Economy of Cities*. New York: Vintage, Random House, 1970.

### Knitter, Bergner, et al. 2012

Daniel Knitter, Max Bergner, Barbara Horejs, Brigitta Schütt, and Michael Meyer. "Concepts of Centrality and Models of Exchange in Prehistoric Western Anatolia". *eTopoi Journal for Ancient Studies Special Volume 3* (2012), 361–368.

### Knitter, Blum, et al. 2013

Daniel Knitter, Hartmut Blum, Barbara Horejs, Oliver Nakoinz, Brigitta Schütt, and Michael Meyer. "Integrated Centrality Analysis: A Diachronic Comparison of Selected Western Anatolian Locations". *Quaternary International* 312 (2013), 45–56.

### Knitter, Nakoinz, et al. 2014

Daniel Knitter, Oliver Nakoinz, Roswitha Del Fabbro, Kay Kohlmeyer, Michael Meyer, and Brigitta Schütt. "The Centrality of Aleppo and Its Environs". *eTopoi. Journal for Ancient Studies* 3 (2014), 107–127.

### Nakoinz 2012

Oliver Nakoinz. "Models of Centrality". *Journal for Ancient Studies Special Volume 3* (2012).



**Nakoinz 2013**

Oliver Nakoinz. "Zentralorte in Parallelen Raumstrukturen". In *Parallele Raumkonzepte. Workshop des Exzellenzclusters Topoi*, 15.–17. März 2010. Ed. by S. Hansen and M. Mayer. Berlin und New York: De Gruyter, 2013, 83–104.

**Pacione 2009**

Michael Pacione. *Urban Geography: A Global Perspective*. London: Routledge, 2009.

**Perlès, Takaoglu, and Gratuze 2011**

Catherine Perlès, Turan Takaoglu, and Bernard Gratuze. "Melian Obsidian in NW Turkey: Evidence for Early Neolithic Trade". *Journal of Field Archaeology* 36 (2011), 42–49.

**Smith, Ur, and Feinman 2014**

Michael E. Smith, Jason Ur, and Gary M. Feinman. "Jane Jacobs' 'Cities First' Model and Archaeological Reality: Debates and Developments". *International Journal of Urban and Regional Research* 38 (2014), 1525–1535.

**Soja 2001**

Edward W. Soja. *Postmetropolis: Critical Studies of Cities and Regions*. Oxford: Wiley-Blackwell, 2001.

**Soja 2003**

Edward W. Soja. "Putting Cities First: Remapping the Origins of Urbanism". In *A Companion to the City*. Ed. by G. Bridge and S. Watson. Blackwell Companions to Geography. Oxford: Wiley-Blackwell, 2003, 26–34.

**Soja 2010**

Edward W. Soja. "Cities and States in Geohistory". *Theory and Society* 39 (2010), 361–376.

**Taylor 2004**

Peter J. Taylor. *World City Network: A Global Urban Analysis*. London: Routledge, 2004.

**Taylor 2012**

Peter J. Taylor. "Extraordinary Cities: Early 'City-Ness' and the Origins of Agriculture and States". *International Journal of Urban and Regional Research* 36 (2012), 415–447.

**Taylor, Hoyler, and Verbruggen 2010**

Peter J. Taylor, Michael Hoyler, and Raf Verbruggen. "External Urban Relational Process: Introducing Central Flow Theory to Complement Central Place Theory". *Urban Studies* 47 (2010), 2803–2818.

**Illustration credits**

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