

Introduction: Nodes in global networks

Sören Scholvin¹  | Moritz Breul²  | Javier Revilla Diez²  |
Andrés Rodríguez Pose³ 

¹Institute of Geographical Sciences, Free University of Berlin, Berlin, Germany

²Institute of Geography, University of Cologne, Cologne, Germany

³Department of Geography and Environment, London School of Economics, London, UK

Correspondence : Sören Scholvin, Institute of Geographical Sciences, Free University of Berlin, Malteserstraße 74-100, 12249 Berlin, Germany.

Email: soeren.scholvin@fu-berlin.de

The on-going COVID-19 crisis demonstrates how interlinked and networked our globalized society has become. It is not surprising that the world economy is increasingly studied through a network lens. In economic geography, the predominant approaches in this regard are global production networks (GPNs) and world city networks (WCNs). These have generated major insights, revealing how globally dispersed places are connected as spatial nodes to one another and how the resulting networks shape both global and regional economies. Yet, while studies on GPNs and WCNs tell us a lot about the ways in which networks initially form and later evolve, the nodes themselves have attracted less attention. There is an emerging literature that complements research on network characteristics by addressing the features of individual nodes, but more conceptual and empirical work in this direction is needed. The purpose of this special issue is, therefore, to delve deeper into nodes in global networks so as to learn about their internal dynamics, specificities, and related effects on the networks in which they are involved.

In spite of its impressive diversity, research on WCNs is, in our reading, still focused on network features and the positionality of city nodes, usually to assess how intensively world cities are linked with each other (Krätke, 2014; Taylor & Derudder, 2016; Taylor et al., 2002a, 2002b; Toly et al., 2012). There are also outstanding single-case studies of cities in worldwide networks (e.g., Grant, 2008; Grant & Nijman, 2002; Price & Benton-Short, 2008; Thompson & Grant, 2005). However, the WCN literature that stands in the tradition developed by the hugely successful Globalization and World Cities Research Network at Loughborough University is not sufficient to uncover the full variety of ways in which city nodes operate and develop. Critics may, hence, argue that it suffers from a tendency to assume that the inner dynamics of major nodes are similar regardless of city and context. The role of city nodes for global networks seemingly only varies by degree, not by function because it is always about the provision of advanced producer services. We appreciate what the WCN literature has

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achieved in terms of concepts, methodologies, and empirical findings. It has greatly inspired our own research. We are aware that it distinguishes between different types of world cities (Rossi et al., 2007; Taylor et al., 2002). We also acknowledge that research along these lines has become extremely broad, reaching far beyond the drafting of urban hierarchies, as van Meeteren et al. (2016) point out. At the same time, we are convinced that one way to generate complementary, new insights is to assess and analyze intra-node processes in greater detail.

The recent trend in Urban Studies to put greater emphasis on diversity (Hoyler & Harrison, 2018) has also provided greater food for thought in terms of how to reflect on the internal dynamics, different paths, and specificities adopted by city nodes in global networks. Using Acuto's words, the WCN literature has much to gain from "valoriz[ing] the plurality of the urban experience while acknowledging its global interconnectivity" (2014, p. 1733). Except for a few contributions, such as those that deal with "world city making" (e.g., Hoyler et al., 2018; Indraprahasta & Derudder, 2019; Krijnen et al., 2017), the contemporary WCN literature, however, seeks to assess city networks on the macro-scale with ever more complex quantitative data and methodologies. The corresponding outputs are, on the one hand, superb. Yet, on the other, we tend to concur with Watson and Beaverstock (2014), who argue that such research may have led to a certain impasse, as it is unable to explain the inter-city connections that it maps. Even scholars who have shaped the WCN literature in recent years admit that there is a gap on "how cities [...] act as regional globalizing centers" (Martinus et al., 2015, p. 78). Zooming into specific nodes as a complementary approach to that focusing on networks advances our understanding of nodes in global networks, as the research on the nodes themselves is necessarily "'grounded' in the specificity of the individual processes [...] through which networks are formed" (Watson & Beaverstock, 2014, p. 419).

Research on GPNs, meanwhile, emphasizes the territorial embeddedness of economic activities. In fact, we would argue that stressing territoriality is the key difference of this literature from the global value chain approach. We therefore think that bringing GPNs and WCNs together is a worthwhile endeavor, as it helps to address major blind spots of our knowledge about nodes in global networks. Territoriality in the GPN approach covers both the macro-level and the micro-level, where regional arrangements—in particular the molding of regional assets by regional institutions—are assessed, as probably best demonstrated by the ground-laying articles by Coe et al. (2004) and Henderson et al. (2002), as well as more recent research by Coe and Yeung (2015). Empirical studies that contribute to our understanding of GPN territoriality on the micro-level are numerous, covering business sectors and regions as diverse as the offshore service industry in the Philippines (Kleibert, 2014) and tourism in Namibia (Kalvelage et al., 2020), to name just two examples.

Cities are largely absent from the GPN framework (for exceptions, see: *Global Networks*, vol. 10, no. 1). This is somewhat surprising because world cities are important nodes in GPNs, providing essential control and service functions for economic activities at peripheral sites (Brown et al., 2010). Surborg's (2012) approach of "vertical world city research" accordingly aims at the connections of world cities and other locations and, hence, holds potential as a bridge from WCN to GPN analysis. It has been taken up by Breul (2020), who shows that world cities and other urban hubs integrate spatially fragmented production processes by providing numerous functions that matter for the organization of economic networks. Positionality and relationality are also central to Phelps's (2019) understanding of cities. He conceptualizes cities as part of GPNs, pointing out that "the value of a logistics and transport perspective within GPNs is that it draws attention to [...] intermediate places" (2017, p. 30). Being economies "in-between," intermediate places connect to networks in other ways as well, for example through export processing zones or trade fairs. With a different focus, Li and Phelps (2016, 2019) show how Shanghai bundles flows of knowledge from and to the Yangtze River Delta region, thus integrating places from its hinterland into GPNs.

In an explicitly conceptual effort to bring GPNs and WCNs together, Scholvin et al. (2019) revitalize the concept of “gateway cities.” In parallel to Sigler (2013), who uses the term “relational cities” instead, they argue that such places integrate relatively large hinterlands into GPNs, further developing an idea advanced by Parnreiter (2010, 2014) and, much earlier, by Burghardt (1971). Gateways are often world cities, but their interlinking function not only rests on corporate control and advanced producer services, which are the features addressed in the WCN literature. Scholvin and his co-authors suggest that gateways are characterized by up to five functions. They not only host corporate control and advanced producer services, but are also logistics hubs, sites of industrial processing, and places where knowledge is generated. These functions are not necessarily additive, meaning that gateways are diverse—both in terms of the role they play in global networks and regarding their spatial range (Breul, 2019; Breul & Revilla Diez, 2017; Scholvin, 2020a).

In addition to the distinction of critical network functions, the gateway approach draws attention to city–hinterland interaction. In the WCN literature, such relations remain a side issue. Corresponding publications are mostly about delimiting spheres of influence of individual world cities (Brown et al., 2002; Hennemann & Derudder, 2014; Taylor et al., 2002). Breul and Revilla Diez (2017, 2018), meanwhile, show that gateway cities bundle certain segments of GPNs. Scholvin (2019) explains that such concentration is largely due to the local density of key actors. It may limit peripheral development, with the gateway absorbing high value-added activities and filtering the gains of participation in GPNs (Breul et al., 2019; Scholvin, 2020b). It may also enable what Parnreiter (2019) calls a “geographical transfer of value” from the periphery to the core of the world economy (see also: Scholvin & Breul, 2020). These findings resonate with GPN research that uncovers poor development outcomes in resource peripheries (e.g., Atienza et al., 2018; Barratt & Ellem, 2019; Mackinnon, 2013). Yet, there are also examples of gateway cities serving as engines of peripheral growth (Scholvin, 2017), which indicates that considerably more research is needed to fully understand nodes in global networks from this particular angle.

In order to advance research on nodes in global networks along these lines, the contributors to this special issue participated in a panel at the Global Conference on Economic Geography held in Cologne in 2018. Coming from different conceptual, methodological, and regional backgrounds, they sought to find common ground and discussed first drafts of the papers that now compose the special issue. The articles are not based on a consent among all those who have contributed to the special issue. They do not represent an attempt by a research group to produce a blueprint for the study of nodes in global networks, but rather showcase the variety of corresponding approaches, implying that only the respective authors are responsible for the content of their articles.

Martinus et al. (2021) propose a typology of brokerage by small states and non-state territories that network economic activities. These political entities provide specialized services to larger economies. They are highly open to trade and other global flows, which enables them to borrow size—an idea from urban studies that goes back to Alonso (1973) and has recently been revived by Hesse (2016). The value added by the article—besides its empirical insights and sophisticated methodology—is that it goes beyond the finding that small states and non-state territories matter as brokers. It uncovers how this role is fulfilled in individual cases: brokers serve as coordinators in multilateral interaction, consultants for relations among others, gatekeepers that provide access for outsiders to their own communities and representatives of their communities vis-à-vis the outside world. They may also establish liaisons between unrelated third parties. The four authors pay special attention to Hong Kong, Luxembourg, Panama, and Singapore, analyzing which of the types of brokerage apply, assessing for which communities these brokers matter and relating the role of each of them to economic and political context factors.

Connecting to their prior research on the interaction of gateway cities and resource peripheries, Breul and Revilla Diez (2021) investigate production linkages in the oil and gas sector in Southeast Asia. In a seminal publication, Morris et al. (2012) concluded that recent changes in the organization of extractive industries create opportunities for development through linkages in resource-rich regions (see also: *Resources Policy*, vol. 37, no. 4). Others are more skeptical and point out that often, these opportunities are not exploited (e.g., Narula, 2018). To advance the corresponding debate, Breul and Revilla Diez apply the gateway concept, which allows them to take an expanded geographical scale into consideration and show that production linkages may bundle outside of resource peripheries. This way, they uncover not only the role that resource-poor Singapore plays as a node in oil and gas GPNs, but they also clearly point at the limits of resource-based development. Furthermore, the study reveals temporal dynamics of gateway–hinterland relations. Labor-intensive, low-tech production linkages that used to concentrate in Singapore are increasingly carried out in Indonesia and Vietnam, whereas Singapore now specializes in sophisticated tasks.

Research on gateway cities, including the aforementioned articles and most contributions to this special issue, focuses fundamentally on economic features of the respective nodes to explain their functions and importance. Rodríguez Pose and Hardy (2021) widen the research agenda. They compare the economic trajectories of Barcelona and Madrid, demonstrating that it is worthwhile bringing institutions and societal factors into the analysis (see also: Rodríguez Pose & Storper, 2006). Although initially better positioned, Barcelona has been overtaken by Madrid as the economic hub of Spain. The presence of stronger and often more exclusionary communitarian groups, and a greater institutional, political, and social polarization in Barcelona—relative to Madrid—have affected over the long-term the attraction of investment, talent, and the promotion of economic activity. Rodríguez Pose and Hardy argue that Madrid's broader-based citizen involvement and its capacity to bridge divides across communitarian groups in the 1980s and 1990s set up the basis for a sustained economic dynamism. Barcelona's growth was, by contrast, largely constrained by a greater presence of exclusive bonding, which translated into a more skewed distribution of public goods, higher entry barriers, and greater transaction costs, curbing to a certain extent the economic dynamism of the city. This is not to say that other factors are irrelevant for the divergent economic trajectories of Barcelona and Madrid. Yet, the authors conclude that differences in socio-communitarian developments are more important in explaining the divergence in the cities' economic paths.

Hutchinson (2021) analyzes the interplay of Singapore with Johor and the Riau Islands—a territory that has been marketed as a growth triangle and “single investment destination” since the 1990s. In the growth triangle concept, Singapore was initially conceptualized as the gateway. Johor and the Riau Islands were seen as hinterlands, supplying labor, land, and resources. Yet, during the last three decades, the degree of interaction between Johor and the Riau Islands has intensified. For instance, Johor matters to Riau Islanders as a destination for health care and higher education. Johoreans travel to holiday resorts in the Riau Islands. Hutchinson acknowledges that the influence of Singapore still looms large. Whereas some flows between Johor and the Riau Islands are independent from the gateway city, most are not and practically all are influenced in one way or another by Singapore. Nevertheless, the main point is that he uses this case study to draw our attention to dynamics in the gateway's shadow, which tend to be overlooked in analyses from the gateway perspective. To overcome this blind spot, Hutchinson complements the gateway perspective with the cross-border region framework.

While Hutchinson's analysis indicates that there can be considerable and positive dynamics in territories that are subordinate to and globally integrated by gateways, the article by Atienza et al. (2021) is much closer to the contribution by Breul and Revilla Diez insofar as the authors argue that these nodes may limit peripheral development. Atienza and his co-authors assess the integration of Chile into copper GPNs, distinguishing the related roles played by different urban nodes—in particular the

city of Antofagasta, which is a major mining hub, and the country's capital, Santiago. Following their assessment, Santiago serves as the gateway because sophisticated activities that allow for the global interlinking of the rest of the country are concentrated there. Antofagasta also fulfills gateway functions, but these are limited to specific and much less sophisticated tasks such as maritime transport of bulk cargo. Against this backdrop, the authors suggest that Antofagasta should be labeled a “backdoor city.” They furthermore reason that various filtering mechanisms by the gateway account for the low territorial embeddedness of copper GPNs and, therefore, poor developmental outcomes elsewhere in Chile.

Scholvin's (2021) contribution also engages with filtering mechanisms and their developmental consequences. It begins with the fact that the literature on resource peripheries is marked by opposed assessments and evaluations of the prospects of development through integration into GPNs. The author reasons that one should not be overly pessimistic regarding the corresponding impact of gateway cities. He analyses the interplay of gateways and resource peripheries in Argentina and Ghana, finding that Buenos Aires and Accra concentrate corporate control in oil and gas GPNs. Argentina's capital also serves as a gateway for knowledge generation and logistics, but opportunities for peripheral development in both countries are mostly reduced by factors unrelated to gateway cities (i.e., challenges typically encountered by small and medium-sized enterprises, rent seeking by and subcontracting of local suppliers). Further to that, Scholvin suggests that while integration into the world economy allows for peripheral development in Argentina and Ghana, the corresponding outcomes may not meet everyone's expectations. Expectations must be more down-to-earth than the overly optimistic statements frequently made by Argentinean and Ghanaian politicians.

Overall, the special issue advances our knowledge of nodes in global networks by further investigating the particularities of such nodes, drawing conclusions on both the nodes themselves and the networks they are involved in. There are, of course, also perspectives not covered here. In particular, there is need for more critical engagement with GPNs and WCNs—for instance, in order to question the sustainability of political strategies that aim at branding a place as a world city or integrating a regional economy into GPNs. Hence, this special issue can be considered as a starting point for further discussion on nodes in global networks, fostering engagement of GPNs with WCNs and broadening the related conceptual and empirical state of the art.

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ORCID

Sören Scholvin  <https://orcid.org/0000-0001-5911-2718>

Moritz Breul  <https://orcid.org/0000-0002-0322-0987>

Javier Revilla Diez  <https://orcid.org/0000-0003-2065-1380>

Andrés Rodríguez Pose  <https://orcid.org/0000-0002-8041-0856>

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