

# **Guest Editorial: Global Production Networks and the Role of Logistics and Transportation**

*Growth and Change, Special Issue on global production networks*

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## **Globalization: Emblematic Paradigm for Social Sciences and Human Geography**

There is an ongoing inquiry concerning the nature and role of globalization in terms of social processes, economic development, culture and tourism, and last, but not least, as it relates to spatial change. Although globalization has been an active field of research in social sciences, which is reflected by the large number of studies being published on this issue since the early 1990s (Dicken, 2003, 7), its complexity and dynamics suggest a whole range of issues that remain unaddressed. Even the term globalization itself remains undefined, since it appears as a “buzzword” (Dicken, *ibid.*) that carries quite different meanings. According to Baumann (1998), globalization is multidimensional and thus necessarily vague: “All vague words tend to share a similar fate: the more experiences they pretend to make transparent, the more they themselves become opaque. The more numerous are the orthodox truths they elbow out and supplant, the faster they turn into no-questions-asked canons” (Baumann, 1998, 1).

Among those questions that need to be answered with respect to globalization are issues such as the historical starting point of globalization, its impact on different regions of the world, and the degree of integration and interdependence that either binds together or separates different actors and territories (cf. Held et al. 1999; Robertson, 1992). First, it is a matter of long standing inquiry when and why globalization took off: Does mercantilism already contribute to early forms of globalization, or does that only originate from late capitalism, particularly supported by enabling technologies (particularly transportation and, more recently, information technologies), and also by the removal of legal barriers such as tariffs since the early 1970s? Similarly the question for a possible fixed end condition of globalization cannot be answered in a plausible way. Second, perhaps one of the most controversial point within the globalization debate applies to the issue of convergence or divergence: Is the world becoming more homogeneous, e.g. in terms of economic development, standards of living or cultural habits, due to the establishment of global markets and global and institutions, or do these processes promote selected areas at the expense of others? There is some evidence supporting the view that conditions are going to be polarized rather than universalized in the course of globalization (Baumann 1998, 18). There is also evidence that stresses that many developing countries are catching up quickly due to a global redistribution of economic activities. Finally, the degree of integration into or even dependency from globalization that stresses regional and national economies remains mostly unanswered.

Thus, globalization brings about completely new forms of global competition that are likely to shape markets, societies, regions and their environments in a fundamental way.

Despite the degree of uncertainty regarding the precise origins, nature and impacts of globalization, there is growing consensus that global integration is a permanent and long term trend that has contributed to fundamental changes and triggered a variety of responses. Assessments of globalization differ significantly from extremely positive (“hyperglobalist” / liberalism) to negative (“scepticist”/ state interventionism) views. There is an emerging understanding that globalization can be best understood as a fundamental *transformation* consisting of a variety of processes and impacts (cf. Held et al., 1999, 3). In this context, Holton (2005) notes at least three basic characteristics that make up the shape of what we currently understand as globalization: i) the rising exchange of people, goods, information, values, habits, as it is particularly indicated by global air travel and maritime shipping, by trade statistics or by an increasing level of social and political interactions, but also by numerous contentions; ii) the increasing degree of interdependence of nation states or national economies, which is particularly evident if looking at the supply, production and distribution of manufactured goods across the globe; iii) the rising awareness in societies that the world is a closed system which has to be shared by the global population, that natural resources appear to be limited (such as oil), and that environmental risks can have wide scale impacts (such as the issue of global warming).

One major issue that received considerable attention in the debate about globalization is the significance of global integration for urban and regional development. Part of this research and discussion is directed towards the emergence of global cities or, at least, globalizing cities (Smith, 2001). According to initial debates on the formation of a “Global City” (Sassen, 2001), some locations have developed capabilities to serve as distinct and highly competitive role to meet the needs of global service firms and the associated business milieux. Under the ongoing influence of globalization, segments of the urban system are increasingly becoming globalized, which leads to quite distinct impacts on cities and regions (Amin and Thrift, 1994). Major regions that serve as important nodes in the system of global exchange may thus profit from globalization. This applies not only for the hubs of global air travel and for the central locations of the global service industries, but also for the global league of container port cities that are handling the growing amount of freight. Critically, many old-industrialized regions have lost most of their industrial base in favor of more competitive places in the neo-industrialized world and thus may not be able to meet the demand of the advanced service and technology sectors for competitive and attractive locations. There is no clear understanding yet on how to respond best to the challenges of globalization locally.

A second and more recent issue concerns the specific interrelations between the global “system” of trade, production chains and networks and the way they are spatially embedded or rooted in local places. It is widely accepted that globalization is not spaceless (thus being associated with a dissolution of material space into the virtual world of information transfer) and that there also is not a causal relationship between a somehow structural demand for amenities and local places that have to fulfill such

imperative. Coe et al. (2004) emphasize this point in the context of Global Production Networks (GPN) and challenge the conventional wisdom of confronting the “global” and the “regional”. According to the authors, it is a close interrelationship rather than a dichotomy between global and regional processes emerging out of GPN. Yet apart from early assumptions on the End of Geography or on the hypothesis of the Death of Distance (Cairncross, 1997), economic development at the global level triggers a complex relationship between different locations at various scales, where material space still plays a vital role in terms of accessibility, flexibility, labor supply, or power and politics (Hudson, 2004). As the transformation of port cities into global mega-hubs has already demonstrated (and is also subject to further elaboration in the papers of this Special Issue), space is becoming critical due to the impacts of agglomeration, economies of scale and congestion. This is a first indication of the important, yet often overlooked, role that the distribution sector plays in the context of globalization.

Globalization with both its universal significance on one hand and its broad variety of possible consequences on the other is undoubtedly one of the most challenging and intriguing research paradigms for social sciences in general, and for geography and urban or regional policy in particular. As part of a more long-term oriented analysis and conceptualization, globalization seems to be an expression of path dependency in many respects and thus follows the *longue durée* observed by historians who conceptualize development in the broader contexts of time and space (see Braudel, 1982). With regard to more recent developments, it also reveals an extent of inter-relation and interdependence at a scale and scope never seen before, particularly looking at telecommunication networks, world trade and the associated flows of people, goods or information (Veltz 2005). Both perspectives make it emblematic for investigating societies or economies and their territorial organization.

### **Trade, Industry, Services: The Emergence of Global Economic Systems**

Due to the variety of approaches offered by social sciences, there are obviously many interpretations on how global economic systems have emerged. Our interpretation leans on an economic and technological perspective where latent capabilities in terms of value creation are able to be asserted while new capabilities are also emerging. This view can be articulated in three phases.

In the first phase, the traditional perspective of international trade prevails. There is a level of *mobility of raw materials, parts and finished products* in a setting which is fairly regulated with impediments such tariffs, quotas and limitations to foreign ownership. What was being traded often involved a range of specific products (and very few services) not readily available in regional economies. Due to regulations, protectionism and fairly high transportation costs, trade remained limited and delayed by inefficient freight distribution. In this context, trade was more an exercise to cope with scarcity than to promote economic efficiency. This phase relates to the development of global trade as an early and still ongoing expression of globalization and prevailed until the 1970s.

In the second phase, the *mobility of factors of production*, namely capital, became possible, particularly from the 1980s. The legal and physical environment in which

international trade was taking place became less cumbersome, leading to a better realization of the comparative advantages of specific locations. Concomitantly, regional trade agreements emerged and the global trade framework was strengthened from a legal and transactional standpoint (GATT/WTO). In addition, containerization provided the capabilities to support more complex and long distance trade flows (McCalla et al., 2004), as did the growing air traffic (Bowen and Leinbach, 2004). Due to high production costs in old industrial regions, activities that were labor intensive were gradually relocated to lower costs locations. The process began as a national one (to more peripheral regions), then went to nearby countries when possible (such as for NAFTA and the EU) and finally became a truly global phenomenon. Thus, foreign direct investments surged, particularly towards new manufacturing regions as multinational corporations became increasingly flexible in the global positioning of their assets. In Pacific Asia, this initially took place within the setting of special economic zones (notably in China), initially adjacent to port cities and which then spread to the interior along communication axes.

The third phase is currently taking shape and builds on the previous two. There is a growth in international trade, which now includes a wide variety of services that were previously fixed to regional markets and a surge in the mobility of the factors of production. Since these trends are well established, the priority is now shifting to the *geographical and functional integration of production, distribution and consumption*. Complex networks involving flows of information, commodities, parts and finished goods have been set, which in turn demands a high level of command of logistics and freight distribution. In such an environment, powerful actors have emerged which are not directly involved in the function of production and retailing, but mainly taking the responsibility of managing the web of flows. The global economic system is thus one characterized by a growing level of integrated services, finance, retail, manufacturing and nonetheless distribution. A good example of these powerful actors is given by the American retailer Wal-Mart, the largest corporation in the world, which has become the “template” for late-modern capitalism (Lichtenstein, 2006). By linking newly emerging, competitive places for cheap goods production and supply (e.g. in China) with major customer markets in North America, among others, the company’s profits are predominantly derived from the organization of value chains and networks.

### **An Economic Geography of Global Production Networks: Extending the Debate**

One specific issue relates to the linkages between the elements of the global economy, the intricate networks established to support trade, the territories involved and the scale at which different interactions are taking place as the more recent way to interpret the changes occurring in the context of globalization. In particular, the emergence of Global Production Networks and their continuing spatial as well as organizational differentiation have led to the increasing importance of the transportation and logistics industries, even if the dimension of physical distribution still remains highly underdeveloped. In the context of early world-system analysis, the term Global Commodity Chains (GCCs) has been coined (Wallerstein, 1988; Gereffi, 1994), and although some differences have been argued (e.g. Birch, 2006), both GPN and GCC tend to represent a functionally integrated

network of production, trade and service activities that covers all the stages in a supply chain, from the transformation of raw materials, through intermediate manufacturing stages, to the delivery of a finished good to a market (see Dicken et al. 2001; Henderson et al. 2002; Coe et al. 2004).

Hess and Yeung (2006) identified four major conceptual backgrounds from which GPNs have emerged in economic geography. The first relates to the value chain framework that investigates the stages of production, competitive strategies and competitive advantages (e.g. Porter, 1980). The second concerns the perspectives of networks and embeddedness which considers organizational aspects to the formation and performance of businesses. The third involves the actor-network analysis where networks of relationships between various global actors are covered. The fourth is the global commodity chain analysis that has investigated the production of commodities as a sequential chain in which value creation takes place. As such, GPNs have rapidly matured as a field of investigation in economic geography and have been widely accepted as a useful perspective for assessing contemporary global economic processes.

While Hess and Yeung provide a salient overview of the state of the research about GPNs, the fundamental dimension of transportation is overlooked over in its entirety. Transportation was not discussed and aspects including logistics and distribution are briefly mentioned with no attempt to explicitly link them with the conceptualizations. The focus leans to value creation while physical flows are considered as an afterthought; from this perspective production and distribution appear highly disconnected. How can this oversight about transportation and mobility be explained? Can it be justified? The most likely reason is that the role of transportation is a derived demand within general economic theory. Therefore, if transportation is a subservient function of other processes and exists as an outcome of the physical flows they generate, why should economic geographers show interests about an activity that can easily be explained (derived) by others? On the other hand, what if this derived demand is more complex than it appears, notably in the current context of an integration of the geography of production and distribution (Rodrigue, 2006)? Additionally, how does the role and emergence of third and fourth-party logistics providers and global port operators fit in this picture of derived demand? This is where the contention lies and where an economic geography of globalization could understate the role of freight distribution.

In order to contribute to this debate, we would like to suggest a fifth conceptual approach to the four provided by Hess and Yeung as antecedent to the formation of GPNs. The *transportation, distribution and logistics* approach is concerned with the value added activities related to the flows supporting GPNs, from modes, terminals and the vast array of activities linked with freight distribution. This approach underlines that the value creation function of GPNs is interdependent with the distributional capabilities set in place by global freight forwarders. There is thus a long way to go in order to reconcile the perspectives of economic and transport geographers about the global economy, its processes and physical and immaterial flows. This special issue aims at providing some stepping stones concerning the role of logistics and transportation in the context of GPNs.

## **The Role of Logistics and Transportation in GPNs**

Globalization has a fundamental link with transportation and logistics, even if the significance of distribution has been overlooked in globalization studies. Yet, “surprisingly, with a few exceptions, the principal conceptualizations of globalization either ignore completely any reference to transportation or make only implicit linkages” (Janelle and Beuthe, 1997, 200). Selected investigations have indeed put significant emphasis on mobility as a (if not the) major requirement for global interaction: “Modern history has been marked by the constant progress of the means of transportation. Transport and travel was the field of particularly radical and rapid change; progress here, as Schumpeter pointed out a long time ago, was not the result of multiplying the number of stage-coaches, but of the invention and mass production of totally new means of travel – trains, motorcars and airplanes” (Baumann, 1998: 14). The historical forms of globalization identified by Held et al. (1999) in their seminal contribution to global transformations are namely networks, flows and interconnectedness. Needless to say that transportation and logistics are fundamental to the emergence and operation of both early and more recent forms of these developments.

GPNs are remarkable manifestations of globalization that we are just starting to grasp. Even if from a conventional perspective the role of transportation in globalization was perceived from the dimension of a facilitator, the contemporary reality of freight distribution points out to a much more complex picture (e.g. Hesse and Rodrigue, 2004; Leinbach and Capineri, 2006). At the core of the contention is the relationship between production and distribution. From a conventional perspective that production and distribution are separate functions with distribution being subjugated to production, the emergence of GPNs underline a higher level of integration between both functions as well as a shift in their relationships. There is indeed a growing “seamlessness” between both, an issue well underlined by the emergence of global transport providers managing multimodal transport networks, often in the form of Third-Party Logistics providers. Also, coming back to the case of Wal-Mart, there is some evidence that the core reason of its rapid success as a truly global company results from its ability to manage its supply-chains extremely efficiently (see Bonachic, 2006).

Thus the role of transportation is considered more than a mere support to the mobility of freight within global commodity chains, but an integral part of the value generation process. While economic geography has paid much attention to the producers of goods and services and the global flows of capital, ideas, and people impinging on production networks, the firms and locations involved in actually moving the materials and products are less extensively researched (Hesse and Rodrigue, 2004). Transport geography, on the other hand, has focused either on local/regional transport and logistics nodes or on particular distribution systems. While both approaches have contributed to a better understanding of contemporary production and distribution, the mere spatial and functional complexity of GPNs underlines the need to find a joint perspective.

The new geography of production thus requires reconciliation with its geography of distribution, linking the various parts of global production networks from raw materials procurement through to the distribution of final products to consumers. Consequently,

there is a need to emphasize the importance of transport and logistics as an integral part of the formation of global production networks and value-added activities. If globalization is associated with a reconfiguration of space-time-patterns, then transport and particularly logistics as major means of co-ordination between both need to be taken into account. There are also significant institutional changes within the logistics industry as an outcome of economic globalization such as the case of containerization and global port operators underline (e.g. Olivier and Slack, 2006; Notteboom, 2004; Slack and Frémont, 2005). From an industry which has a high level of spatial fixity (e.g. terminals), these changes have shown a remarkable ability for transportation to provide flexibility in the level and range of its services.

## **The Papers**

With this in mind two special sessions on the topic of “Global Production Networks, Logistics and Transport” were organized for the 2005 conference of the Association of American Geographers (AAG) in Denver, Colorado. The sessions were organized by Martin Hess (University of Manchester), Markus Hesse (Freie Universität Berlin) and Jean-Paul Rodrigue (Hofstra University) and co-sponsored by the Economic Geography and the Transport Geography Specialty groups of the AAG. Out of the papers presented, five are included in this special issue.

In “*Transportation and the Geographical and Functional Integration of Global Production Networks*” Rodrigue provides a conceptual framework for the interpretation of the structure of GPNs. Two major forces, geographical and functional integration, are at play, each of which emphasizes the fragmentation of production linked with the emergence of GPNs. The outcome of this fragmentation, in terms of the incurred organizational, managerial and energy costs, are more than compensated by the efficiency of freight distribution. Thus, GPNs are fundamentally transport-dependant structures, although this dependency concerns the wide array of value added activities pertaining to logistics.

Woxenius offers conceptual and empirical evidence on the crucial factor of time in GPNs in “*A Time Perspective on Transportation in Global Production Networks*”. Time itself takes many interpretations depending on the actors, their strategies and the concerned products. He proposes a perspective based upon the elements of transport time, order time, timing, punctuality and frequency. These elements are particularly useful to assess the consequences of extending production networks from existing (declining) manufacturing regions to distant lower cost locations.

“*Freight integration in liner shipping: toward integrators serving global production networks*” by Notteboom and Merckx provides a perspective on the diversification and the comprehensive approach to freight distribution that container maritime shippers are adopting in view of contemporary GPNs. Those truly global transport operators demonstrate an impressive flexibility in their adaptation to changes in the supply chains they service. Although there is no single strategy adopted by the carriers, the investigation points at growing attempts at integration to better meet their respective strategic interests.

In “*Global chain, local pain. Regional implications of global distribution networks in the German North Range*” Hesse discusses the difficulties local (German) actors are facing in view of the growing pressures, notably in terms of infrastructure provision, that globally oriented production and the associated distribution needs create. Several actors and institutions are involved in the management of the supply chain, with very different powers and interests. In such a context, transport infrastructure expansion is becoming increasingly controversial. How local and regional places could better respond to the new imperative of logistics and distribution needs to be reconsidered. He argues that the network paradigm could lead the way to a more balanced, co-operative and competitive regional distribution system

Lee and Rodrigue investigate the substantial shift in the Korean port system related to a growing focus on China as a production base for Korean goods in “*Trade Reorientation and its Effects on Regional Port Systems: The Korea-China Link along the Yellow Sea Rim*”. This “China Effect” is inciting Korean manufacturing activities to reposition their capital and equipment assets in China to enlarge their market potential as well as to reduce their production costs. In such a context, a new logistical structure is being established around the Yellow Sea Rim, modifying the existing role of Korea in GPNs. These changes are bringing a reorientation of the regional maritime industry and of the Korean port system.

### **Putting the global in production networks**

The papers demonstrate a growing willingness and interest from economic and transport geographers to move along the “academic supply chain” to consider the integrative level that transportation has attained in regard to global production. Still, GPNs are far from being functional and efficient entities. Their setting has been rapid and the source of a lot of destabilization for the global economy. The complex and imbalanced relationship between the production-oriented China and the consumption-oriented United States can be perceived as an unstable outcome of very flexible GPNs. The fixity of territories is in contradiction with the flexibility of many corporations. This is particularly the case for those that have retained a core of research and development, marketing, and distribution activities (much of the high added value) while subcontracting as much as possible of the lower added value activities (mainly production) to offshore locations.

Many questions remain regarding the forms that global production and distribution will take in the coming years. Will we experience an extension of the current processes leading to even more globally-oriented structures, or are we going to face devolution due to latent protectionism, the difficulties of hubs to provide infrastructures and surging energy prices? Transportation is likely to be one of the key factors in this development since its capacity to cope with changes will significantly influence the structure and cohesion of GPNs. For instance, maritime transportation has become a very efficient global distribution system and will continue to offer a strong support to GPNs. In such a setting, inland/hinterland transportation will greatly shape the future of freight distribution and the embeddedness of GPNs.

It is worth underlining that transport companies, namely maritime shippers and third-party logistics providers, have become truly global entities, possibly more so than manufacturing. Although manufacturing is a globally-oriented activity in terms of locational flexibility, it is deeply rooted in local conditions related to labor. While components of transportation systems, for example terminals, are also rooted in local conditions due to site and accessibility constraints, the modes themselves have shown a substantial flexibility where networks and services can be modified on a short notice. Transportation is thus a significant element placing the “global” into production networks and needs to be better considered as a part of the emerging literature on GPNs (Hall et al., 2006).

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