

Rethinking Transportation in Global Value Chains: The Puzzling Case of Port Industry

Abstract:

This paper explores how transportation has been dealt with in Global Value Chains (GVCs) literature and argues for a reassessment of logistic activities not only as links in a chain, but also as a chain in itself. Although transportation costs have been following a strong downwards tendency since the end of the Second World War, and have thus become a secondary variable for companies involved in the production of commodities, logistic chains have significantly expanded and introduced original modes of chain governance. Drawing on the case of port industry in Europe, this paper suggests that accounting for these modes of governance requires to broaden the theoretical lens of GVCs studies.

Since the middle of the seventies, the so-called containerisation of maritime transportation has strongly contributed to the standardization of loading and unloading techniques. It has also rendered information easier to convey and transactions to codify. Under such conditions, one could have expected companies in port industries to focus on their core activity and to rely on arm's length market relations for the others. Since the beginning of the nineties, however, a strong tendency toward further vertical integration of shipping and stevedoring activities has been taking place in European ports. Especially, prominent carriers have undertaken massive acquisitions of port terminals and thus tried to seize control over the wharves. Some of them, such as the giant Danish company Maersk, have even been expanding their operations toward ground transportation systems.

This paper attempts to account for the logics underlying these strategical shifts and offers theoretical insights, inspired by the theory of fields developed by Fligstein and McAdam, to capture the novelty of these modes of governance that surprisingly combine vertical integration and low level of asset specificity. It is suggested that structural approaches to GVCs, i.e. approaches grounding their explanations in transaction costs theory, necessitates further conceptualization of how actors compete for the survival of the chains they are involved in. Since ports can be seen as scarce points of entrance to hinterlands, they constitute relevant sites to observe how tensions for the control over the main trade routes have shaped logistic activities in the last decades.

Keywords: Logistic chains, Port industry and Transportation

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The provision of goods and services in global markets relies upon worldwide networks of production units that articulate the functions of design, manufacturing, transportation and marketing. Global value chain (GVC) studies constitute one of the most stimulating attempts in social sciences at understanding how this wide range of activities are coordinated with each other, that is, brought together in a more or less orderly fashion. Their focus lies on firm-centred forms of governance of the global economy (Gibbon et al. 2008: 316). The purpose of this article is 1) to explore how GVC scholars have dealt with transportation, one of the key stages of the provisions of goods and services in global markets, and 2) to make the case that more attention should be paid to the topic by presenting preliminary evidence on the case of port industry. At core of this argument is the idea that, despite the development of more efficient means of transportation and communication, “moving materials in a global age” (Birtchnell, Savitzky, and Urry 2015) remains a challenging endeavour that poses substantial organizational problems and offers relevant puzzles to solve for social scientists.

There are two different ways of looking at transportation from a GVC point of view. First, transportation may be thought of as component of a larger chain. The attention is drawn to how leading companies manage to leverage the logistic end of their activity and to sort out distribution issues. The second option consists in investigating transportation as a chain in its own right, that is, as an independent production network oriented toward the provision of commodities distribution services. The focus shifts therefore to the specific modes of governance of global logistics and to the broad range of actors it involves. Although these two analytical perspectives imply different research questions, they might sometimes overlap. Rather than conceiving of them as opposite, it is here suggested that they nourish each other. My main argument is nonetheless that, albeit GVC scholars have strong empirical grounds not to consider the first conceptualization as pivotal, further investigation of the second is needed not only due to the paramount importance of transportation for the global economy but also as a research site from which to challenge conventional GVC theories.

Recent shift in transportation toward further integration of the chain is indeed at odds with the premises of the theoretical frame, notably based on transaction cost economics, that tends to dominate the field. Empirically, this shift runs against the idea of the growing prevalence of outsourcing and market-length relationships over hierarchical modes of governance (Gereffi, Humphrey, and Sturgeon 2005: 79). Although the aforementioned authors notice that this trend is not likely to occur in every industry, I contend that the magnitude of the mergers and acquisitions strategies in transportation cast doubt on the overall relevance of the historical diagnosis on offer in GVC literature. From a theoretical standpoint, the phenomenon also raises fundamental issues

that the case of the port industry epitomizes. If one follows the transaction cost line of reasoning that permeates GVC literature, the standardization of this industry through the diffusion of container technologies should indeed have resulted in a strong divide between shipping and stevedoring activities¹, especially as the latter is less profitable than the former. Instead major shipping companies have been trying to seize control over the wharves by buying out terminal operators all across Europe. Making sense of the modes of governance in logistics thus necessitates that tools be devised to address this puzzle. Those tools could in turn constitute redeployable assets for the study of global value chains.

The first section of the article presents a critical appraisal of GVC approaches to transportation. The second proposes to delve into the case of port industry and to delineate the kind of theoretical puzzles logistics offers GVC scholars to tackle². The third discusses assumptions with regard to this puzzle and argues for the necessity to address other forms of uncertainty than those at core of transaction cost economics.

Transportation in GVC studies

The following analysis of the literature has no claim to be exhaustive. It rather presents a reflecting exploration of the literature through the lens of transportation. Therefore, it mostly includes seminal references in the field of GVC studies as well as articles and books that touch directly upon the topic under scrutiny within global commodity chains analysis. Including the latter, from which global value chains analysis stems, allows to highlight the line of reasoning through which, I contend, transportation issues have come to be neglected. Some forays into production networks theory are also made on the grounds that it offers stimulating alternative perspectives to the literature primarily discussed here.

Global commodity chains and the development of transportation systems

The global commodity chain approach is an attempt to grasp the core-periphery dynamic of global capitalism from a historical point of view (Gereffi and Korzeniewicz 1994: 2). Along these lines, transportation has been problematized as a driving force in shaping production networks. In her contribution to *Commodity Chains and Global Capitalism*, Sheila Pelizzon argues for instance that the

¹ Stevedoring activities refer to the loading and unloading of berthed vessels. They are usually taken care of by terminal operators that operate cranes and hire longshoremen on a more or less regular basis.

² In this paper, logistics is synonym with transportation, albeit it is often mobilized in a broader sense to refer to the spatial and temporal organization of the production process.

development of a canals system in the south of France largely contributed to the transformations of the grain flour commodity chain that occurred in the 17th and 18th centuries in Europe (Pelizzon 1994: 41). Attention is thus paid to the mechanisms whereby transportation affects the distribution of economic activities across time and space in a context when the connections among production units remained scarce, slow and often exposed to banditry and piracy. This suggests, in line with Marx argument of the “annihilation of space by time” (Marx, 1973: 459), that transportation issues were overcome through the development of denser and faster networks of trade routes. In this way, space constitutes a constraint that belongs to a bygone era, and as such does not deserve careful investigation. I contend that this conception of transportation pervades the literature on global value chains. Prior to delving into the core of this literature, I would like to mention another approach to transportation in global commodity chains that raises a different set of issues.

In an attempt at providing a comprehensive history of automotive commodity chains, Erica Schoenberger describes what the shift from Fordism to the just-in-time (JIT) model of production implied for the transportation system enabling the flows of raw material and semifinished products between production units (Schoenberger 1994). Under Fordism, flows were to follow the steady pace of the manufacturing process and were arranged like clockwork. According to the author, it entails that transportation was not considered a challenging organizational endeavour. Although one might raise doubts over the accuracy of this historical diagnosis, it stands in line with the conception of distribution as a problem of a bygone era. Nonetheless, the later implementation of the JIT model of production was synonymous with increasing complexity in the transportation system. Indeed, JIT required further flexibility to adapt to the whims of the customers preferences and the fluctuations of the demand curve. Consequently, the flows of goods between production units lost their regularity and became an organizational problem of paramount importance. In other words, transportation was back into the set of constraints facing manufacturers. Nonetheless, the strategies to address these organizational issues have, as far as know, not attracted much attention in the field, except for a few studies looking at raw material extraction industries, that is, at a limited and highly specific segment of transportation (Ciccantell and Bunker 1998; Ciccantell and Smith 2009).

This short foray into global commodities chain studies leads to a twofold conclusion. First, transportation is most often considered in the literature as a component of larger production networks. Albeit transportation is not studied in its own right, transportation systems are nonetheless considered relevant to the study of the geographical expansion of global markets. The topic, however, remains neglected in that it is thought of within the field either as an historically delineated constraint or as a black box that does not necessarily requires further investigation. Even

less attention, I contend, has been paid to the topic since the emergence of global value chains studies.

Global value chains and the decline of transportation costs

Looking at how transportation has been dealt with in GVC studies, that is, the strand of literature taking over at the turn of the century the project of commodity chain analysis, leads to the straightforward conclusion that the topic has attracted very little attention within the field. Although acknowledging the analytical strength of GVC theoretical frame, geographers Hesse and Rodrigue for instance already noted more than a decade ago that “it is still missing appropriate coverage of the freight and logistics dimension” (Hesse and Rodrigue 2004: 177). The purpose of this section is to demonstrate that this statement is still right and to disentangle the rationale behind this lack of consideration displayed by GVC scholars toward transportation issues.

To do so I browsed the most cited publications in the field of GVC studies in search for analysis of the role of transportation in the global economy. In most of the references scrutinized, the topic was not even touched upon or winnowed down to footnotes (Gereffi 1999; Gereffi et al. 2005; Ponte and Gibbon 2005; Sturgeon 2002). Nonetheless, in their introduction to a special issue of *Economy and Society* dedicated to global value chains, Gibbon et al. provide a clear explanation of the conception of space and transportation in GVC analysis: “The main peculiarity of the present phase of globalization is that it coincides with generally falling regulatory barriers to international trade, significant advances in communication technologies and declining transportation costs, which facilitate the dispersion of production activities across space” (Gibbon et al. 2008). In line with the argument presented above, GVC scholars argue that transportation is no longer a key component of the value chain on the ground that it only provides companies with reduced opportunities to leverage, that is, to economic upgrading. The few existing studies on transportation in the literature do not depart from this line of reasoning. Poulsen et al. focuses for instance on the potential and limitations of ports for environmental upgrading instead of looking at deeper industrial or organizational issues they could call into being (Poulsen, Ponte, and Sornn-Friese 2018). The literature keeps avoiding to address the core of the topic due to its alleged lack of relevance in a context of decreasing transportation costs.

Although the argument relies on strong empirical evidence, it nonetheless does not capture all the complexity of integrating transportation to value chains. In sectors where moving the commodities imply complex and time-sensitive operations, transportation might remain a challenging endeavour (Bunker and Ciccantell 2005). Global fresh vegetable value chain for

instance necessitates that close attention be paid to every stage of the distribution process (Dolan and Humphrey 2004: 499). Even if one assumes that the transportation costs for fresh vegetables still account for a marginal share of the price, it poses a broad range of organizational problems that the selling company at the end of chain may be more than eager to solve. Staples that arrive stale or decayed at the retail or grocery shop are indeed synonymous with losses of income. In other words, it seems that in specific sectors transportation is still to play a role of paramount importance for the chain that might be subject to upgrading. One of the key arguments of this paper is nonetheless that transportation raises important issues for global value chains even at its highly standardized core that constitutes the world of container hauling.

The lack of attention paid to transportation within the literature on global value chains constitute the research gap that this paper aims to start addressing. At first sight, GVC scholars seems to have valid reasons to consider the topic marginal given the decrease in transportation costs, which might render looking at distribution issues a vain endeavour. The next section, however, will demonstrate that considering transportation chain as value chains in their own rights is relevant in different respects. In other words, I will make the case that this research gap is worth investigating.

The puzzling case of the European container port industry

The empirical material used in this section mostly stems from the vast body of literature on port and shipping policy. The focus lies here on the segment of the European port industry specialized in container handling since the privatization wave of the eighties that I call, in line with indigenous classification, the container port industry.

The container port industry: a case in point to study transportation

Studying a chain as a whole poses two interrelated issues (Bair 2008). First, global production networks link together a broad set of actors and processes. As such they are hardly grasped through a single gaze and have to be analytically divided into different segments in order to be properly investigated. Second, global value chains are seldom under the yoke of a single mode of governance. In this way, governance is often specific to a given pair of nodes. In line with the first part of the argument, it is here suggested that looking at transportation as a whole would constitute an endeavour out of reach. Nonetheless, I contend that container port industry epitomizes ongoing trends in transportation systems toward further integration, on the ground that it was precisely the

segment of the chain in which it was less likely to happen due to its alleged higher degree of standardization. In that sense, the case is especially interesting because it constitutes an exception to existing theories and “contradicts a pattern objectified as such” (Ermakoff 2014: 228). Container port industry is thus a research site from which to assess the validity of the main theoretical insights of GVC analysis.

In addition, it is here suggested that given the sharp decrease in freight rates in the last decades the pressure within transportation systems has shifted from its different segments to the nodes that link them, which makes them even more worth of scientific investigation. The case of the shipping industry offers a good illustration of this principle. A ship-owner that operates on global sea routes is less likely to encounter pitfalls at sea, where its vessels sail at a steady speed without facing major risks, than in ports where their cargoes might not be handled properly or in time. As this example points to, ports constitute nodes of paramount importance in that they connect sea and ground transportation systems. Though some attention has been paid to logistic providers in the adjacent field of production networks, the story of ports as a link among the components of global values chains remains to be told.

The container port industry since the privatization wave of the eighties

Glancing at the waterfront, one might be struck by the variety of facilities one’s eyes encounter. Ports are industrial and logistic clusters. Manufacturers from different sectors locate facilities on docks in order to benefit from the propinquity with their suppliers of semifinished products and raw materials. The transportation side of a port exhibits itself a high degree of diversity. There exist different methods to ship commodities according to their material features. Some commodities are hauled by containers whereas others have to be stowed straight into the holds of the vessels or to be loaded and unloaded individually. The latter techniques of shipping are usually referred to as bulk and breakbulk cargoes. To these different forms of shipping correspond differentiated markets whose boundaries are very seldom crossed. The purpose of this article is not to make sense of the whole port industry but to focus on this segment of the industry that consist in loading, unloading and storing containers. In doing so, theoretical insights from GVC studies are called into question. Specifically, the focus lies on the connection between the container port industry and the segments of the transportation system to which it is connected, the shipping industry on the one hand, and the barging, railway and trucking industries on the other.

Not only are ports industrial and logistic clusters, but they are as well complex organizational settings including public and private actors that pose the key question of the division

of labour among them. Since the privatization wave at the turn of the nineties, which dramatically affected the European waterfront, the prevailing models of port governance have become those of the landlord and comprehensive ports (Brooks 2004; Cullinane and Song 2002)³. Both are based on the idea that the state should not be involved in the core of the economic activities and stick to a set of tasks ranging from the leasing of the land and the dredging of the waterways to the exertion of its sovereign power. In other words, these models entail further freedom for private companies to operate without promoting full privatization of port facilities. The key element here is that privatization policies at the turn of the nineties created the necessary conditions for port markets to emerge. They were indeed formerly dominated by bureaucracies as the state or the powerful longshoremen unions instead of being subjected to free competition. Looking at these industries in the aftermath of their privatization involves to look at markets, and especially at port container industry, in the making.

Looking at the mode(s) of governance that affords coordination among the industries aforementioned involves to first to look at the market structure of the key industry under scrutiny. Drawing on existing literature, I argue that container port industry has been characterized by two interrelated trends since the privatization waves of the nineties. On the horizontal level, local stevedoring competitors have kept losing ground on international terminal operators whose main goal is to expand their market share through mergers and acquisitions, be it as a mean to generate economies of scale or as portfolio diversification strategy (Notteboom and Rodrigue 2012; Rodrigue, Notteboom, and Pallis 2011). On the vertical level, shipping companies have attempted to seize control over the wharves by buying out terminal facilities all across Europe, and have thus become one of the prominent actors in the container port industry (Midoro, Musso, and Parola 2005; Parola and Musso 2007)⁴. As shown in table 1, Maersk, CMA CGM, MSC, the leading shipowners trident, have all engaged in such a strategy through the development of subsidiaries. Other Asian competitors play a major role in this game as well. In addition, collaboration among traditional port operators and shipping companies through looser forms of contracts only started in the mid-2000s, which suggests that a fierce battle took place a couple of years earlier for the control of emerging market opportunities in the wake of the state devolution to its core functions (Soppé, Parola, and Frémont 2009). At the other end of the market nonetheless, no inland

³ Although the turn of the nineties constitutes a watershed for port industries in Europe, the pace of the reforms varied drastically across countries. In many countries, attempts at enhancing free market are still ongoing. One of the reason to deal with the European case instead of the Asian for instance is nonetheless that it offers a certain homogeneity allowing for sounder comparisons among cases.

⁴ The literature within the field of maritime policy offers empirical insights of paramount importance. Nonetheless, due to the purpose it serves, that is, providing the industry with tools to enhance industrial practices, it lacks theoretical discussions. Although some of the flagship journals have quite a high impact factor, the field tend to be self-referential and tough to connect with other approaches.

transportation companies have so far undertaken the same strategical shift, whereas Maersk, for instance, developed a growing interest in acquiring railways and integrating further steps of the chain.

Table 1: Market shares ranking of some major shipping companies in the stevedoring industry (2001-2009)

	2001		2006		2009	
	Market Share	Ranking	Market Share	Ranking	Market Share	Ranking
Maersk	5.5	3	10.7	2	12.0	2
Evergreen	1.8	7	2.1	7	1.8	8
Cosco Pacific	1.8	8	5.0	5	6.9	5
MSC	n/a	n/a	1.7	9	3.5	6
CMA CGM	n/a	n/a	n/a	n/a	1.5	10

Source: Notteboom and Rodrigue, 2012, Based on data from Drewry Shipping Consultants (2005) “Annual Review of Global Container Terminal Operators 2005”, London and Drewry Shipping Consultants (2010) “Global Container Terminal Operators 2010: Annual Review and Forecast”, London.

The French port of le Havre is a case in point to illustrating the twofold historical trend depicted above. Its container handling facilities comprise three terminals spread on a dyke that saw the light of the day at the turn of the 21st century in an attempt sustained by the state to catch up with northern European competitors. This enterprise resulted in international terminal operators and prominent shipping companies seizing control of the wharves of the French port while keeping a step back and letting their subsidiaries operate under the name of legitimate and well-established local stevedoring companies. The first of the three terminals to open at the end of the nineties was a joint-venture of Maersk and Perrigault, the life achievement of a celebrated entrepreneur of Le Havre. The second came into being under the auspices of MSC which invested massively to keep a local company afloat. A few years later, CMA CGM entered into agreement with DP Dubai, an ever-expanding Port Holding, to create a subsidiary so as to operate the third terminal. This case fits in the global narrative retrieved from the literature and call into question the rationale for these global actors to take over the local stevedore companies. What mechanisms or theories may be used to make sense of this wave of acquisitions and, in a broader perspective, the tendency toward further integration in the transportation end of production networks? The answer to this question

is all but straightforward if one is to endorse the global value chain approach to interfirm relationships. In the next section, I will lay out the foundations of this theoretical framework and discuss them in respect with the specificity of transportation systems.

Global value chains, transaction cost theory and vertical integration in transportation systems

The following discussion focuses on the theoretical framework on offer in the article by Gereffi, Humphrey and Sturgeon published in 2005, *The Governance of Global Value Chains*. The rationale behind this choice is threefold. First, the article is by far the most cited article in the field and thus constitutes a cornerstone for discussions related to global value chains, be it as a perspective to overcome or to endorse. Second, the authors claim that their model is to cover a broad range of cases through its deliberate simplicity: “Our intention is to create the simplest framework that generates results to real-world outcomes” (p.82). In other words, the purpose of the article is to provide key insights that could nourish attempts at grasping governance along global value chains and therefore become a general model. Third, the article draws on the contributions of prominent scholars which it brings together to devise a theoretical synthesis. All these elements points to the centrality of this theoretical framework for a field of research that exhibits a certain sense of unity. Nonetheless, the reflection I provide is to be considered a deep critique against the model and GVC studies in themselves. Rather, as I’ve started arguing, transportation and the port container industry are relevant research sites to revise or expand upon this theoretical framework that might in turn bring clarity into the patterns of governance on which container port industry rely.

a. The foundations of the model

The aforementioned article provides two sets of interrelated theoretical propositions. Its first aim is to build a typology of governance forms that goes beyond the classical distinction between market and hierarchy by incorporating alternative mechanisms of coordination relying on different network mechanisms. In a second step, the authors devise three criteria to predict which form of governance is most likely to prevail among components of global value chains. The focus is here on this second aspect. The first of the three criteria concerns “the *complexity* of information and knowledge transfer required to sustain a particular transaction” (p.85). The focus is here on the cognitive endeavour, and the costs it implies, necessary for actors within production networks to coordinate with each other. It is assumed that the more convoluted this process, the more integrated the chain due to the higher capacity of hierarchy to circulate and impose requirements

internally. The second criterion builds on the first in that complex information and knowledge are less likely to be codified and used by the suppliers without transaction-specific investments. In other words, complexity increases asset specificity and thus incentives to opt for tight forms of network governance or vertical integration. Third, company decision on whether to outsource or produce in-house is contingent on the capabilities of suppliers to actually provide the service or good in question. In total, vertical integration is most likely to occur in transactions that do not rely on standardized procedures or in sectors that lack the productive potential to comply with the buyers expectations.

b. The contribution of transaction cost theory

It is nonetheless here suggested that these criteria need to be further scrutinized with respect to transportation, and especially to the port container industry. To do so, I argue, necessitates to hark back to the transaction costs roots of GVC analysis. Transaction costs economists and affiliates have indeed devoted careful attention to logistics (Cho 2014; Hall and Olivier 2005; Palay 1984). All these studies advance empirical evidence for Williamson's statement about the railway industry, which might be applied to the whole logistic chain, that "rolling stock that is easily redeployable among shippers is owned by carriers while that which is specialized to shipper needs and cannot be redeployed except at great sacrifice is owned by shippers" (Riordan and Williamson 1985: 376). The point is that commodities are more or less easily shipped through standardized methods, which implies that their haulage necessitates assets exhibiting varied degrees of specificity. In moving the goods, companies indeed face issues related to the materiality of the cargo they are in charge of that might affect the form of governance upon which coordination along the chain relies. Nonetheless, transaction costs economists do not contend that cognitive processes need be neglected but rather that material issues can't be circumvented with respect to logistic activities. Containers, cars, minerals cannot be shipped likewise, which lead Williamson and his disciples to argue that these sectors are most likely to display different organizational foundations⁵.

The second element of transaction costs theory to incorporate into GVC analysis is site specificity, which usually refers to "a situation where the buyer and the supplier are involved in a "cheek-by-jowl" relationship with one another due to the importance of close proximity in reducing inventory and other related processing costs" (De Vita, Tekaya, and Wang 2011). Slightly reconceptualising site specificity is nonetheless necessary to fit the case of container port industry.

⁵ Quite interestingly, little attention has been drawn to container industries despite its centrality in modern transportation systems. In contrast, a substantial number of studies have looked at bulk and breakbulk organizations from the point of view of transaction costs economics.

Indeed, there is no need for shipping or railway companies to locate their headquarters next to port facilities and what is at stake here is not the propinquity of their respective assets. The site specificity of port stems from its unique position as gateway to a particular hinterland, that is, to potential market shares for actors along the chain. It has been therefore suggested in the literature that such a setting exposes a shipping company to opportunistic behaviour on the grounds that stevedores might turn away from it and grant access to their facilities to the highest bidder instead (Kaselimi, Notteboom, and Borger 2011). Accordingly, struggles for the control over the wharves, and thus over the rare points of entrance to the market, revolve around the issue of access to limited but pivotal assets. This creates theoretically strong incentives to vertical integration.

c. Time-sensitivity and vertical integration in transportation

Third, the model would analytically benefit from incorporating at its core time-sensitiveness as a key to explaining governance patterns within transportation systems. Although this issue is mentioned in the article of Gereffi and al. (p.84), the theoretical perspective on offer, and especially the three criteria to predict which mode of governance will be put in place, do not spell out the conditions under which it affects global value chains. Transportation might however be thought of as an industry in which productivity heavily relies on time management, on the ground that container port throughput is contingent on the pace of the whole process. Therefore, this might be appealing for companies to engage in forward integration if such an endeavour is synonymous with enhanced efficiency.

d. Conclusion

This discussion of the major theoretical framework within GVC analysis has shed light on aspects that need be included to its original layout in order to make it suitable for the investigation of transportation. As shown in table 2, five variables may guide such an investigation and theoretically help predict patterns of governance in the port container industry: cognitive complexity, capabilities, asset specificity, site specificity, time-sensitiveness. The next set of the reasoning consists in an attempt at applying such a framework to port container industry and thus estimate its explanatory potential.

Table 2: Criteria to predict patterns of governance within transportation from a GVC perspective⁶

	Vertical integration	Outsourcing
Cognitive complexity	High	Low
Capabilities	Low	High
Asset specificity	High	Low
Site specificity	High	Low
Time-Sensitiveness	High	Low

The puzzle of the port container industry

The diagnosis regarding these criteria’s ability to grasp the strong tendency toward further integration in the container port industry is that, in many respects, it makes the case more puzzling than it provides a clear understanding thereof. In this section, I will argue that, given the features of this industry, outsourcing of stevedoring activities should have been the prevailing strategy according to the specifications of the theory laid out above.

The key argument here is that the container constitutes the most standardized transportation mode of commodities. Although convincing the whole industry of the necessity to adopt this new technology involved decades of political and technical struggles, the twenty-foot has come to corner the market since the turn of the eighties (Levinson, 2006). Ever since, it has been used in inland, sea and air transportation systems and contributed to linking them together in a more coordinated manner. In addition, the range of commodities carried by containers has kept expanding over time, fuelling in this way the standardization dynamic it previously triggered (Rodrigue, 2017). Accordingly, loading, unloading and stowing operations have been standardized and the asset specificity of the gear necessary to carry them out has sharply decreased. Containers are nowadays handled by cranes and forklifts that meet exactly the same specifications all over the world and whose owners face intense intra and inter-port competition⁷. This makes stevedores less likely to engage in opportunistic behaviour and shipping companies less likely to integrate.

The containerization of transportation also implies a shift in the nature of the knowledge underpinning transactions within the industry. Although information sharing among the components of the chain yet relies on complex electronic devices, the diffusion of containers has

⁶ Note that for the purpose of this article, and in order to get straight to the point, I do not address the question of alternative, network-based forms of governance. In addition, empirical evidence suggests that container port industry is seldom organized according to one of them.

⁷ Worth noting is that the cranes used to load and unload containers remains quite easily redeployable despite their size and weight. They are often moved from a wharf or port to another aboard the same vessels they usually handle.

led to technological advances that enhanced the traceability of commodities and contributed to simplifying quantification and scheduling operations. In other words, it turned transactions in container port industry into highly codifiable and easily monitored processes. In GVC analysis, such a tendency is nonetheless correlated with outsourcing strategies. Once again, the case is at odds with explanatory model.

As to the capabilities issue, the investigation implies to embrace a historical gaze. The privatization wave at the turn of the nineties was indeed devised, among other arguments, as a response to the lack of infrastructure in the port container industry to keep up to growing flows of commodities. Becoming stevedores was thus at the time a strategy for shipping companies to secure assets crucial to their growth. Nonetheless, international terminal operators were more vigorous in their attempts at reaping the benefit of the windows opportunity opened by neoliberal policies in Europe. Although it appears that existing capabilities did not suffice to sustain shipowners activity, their commitment to the development of facilities remained at first limited. Quite surprisingly, it increased later, after the consolidation phase of the industry (Notteboom 2002). There is thus evidence for a limited influence of capabilities issues on the transformation of governance. If one assumes that shipping companies avoided to invest in stevedoring activities at the outset of the period due to lack of liquidity, it remains hard to explain why they did not enter into collaboration with international operator to offset their limited resources.

Does nonetheless site specificity constitute a sounder explanation to the tendency toward vertical integration within the port container industry? Interrelated shifts in transportation systems across the timespan under scrutiny cast substantial doubt on this assumption. According to existing studies, the main criterion for shipping companies to decide on berthing location is no longer access to hinterland but cheap and fast logistic capacities. The development of efficient inland means of transportation has indeed reduced the space-constraint and enabled vessels to unload farther from the final destination of commodities. Instead of sailing to Le Havre in order to deliver goods to the French market, containerships may nowadays go to Rotterdam or even Hamburg. It follows that site specificity of port terminals, as defined above, has sharply declined in the last decades. This statement is further supported by the growing competition among ports over expanding coastal areas such as the Northern range or the western part of the Mediterranean coast⁸. There are thus most likely no strong incentives for shipping companies to further integrate stevedores on the basis of site specificity.

The last argument to consider is perhaps the trickiest. The key idea here is that, although a container terminal has the capabilities to deal with all the demand for handling services over a year

⁸ The Northern range refers to the main ports on the English Channel and North Sea coasts.

or a month, on shorter spans of time congestion might occur along with scheduling struggles. Under these circumstances, dedicated terminals, that is, terminals owned and operated by shipping companies aiming at securing berthing spots for their vessels, appear as a reliable solution on the ground that they help avoid potential chaotic and costly haggling (Haralambides, Cariou, and Benacchio 2002)⁹. In addition, time-sensitiveness issues might also stem from lack of efficiency at container terminals. The throughput of a stevedore, as well as that of a shipping company, is indeed highly contingent on longshoremen ability to manoeuvre cranes at high pace and on efficient coordination among the different stages of the loading and unloading operations. This issue, though it mostly gets back to the previous discussion on capabilities, suggests that time constitutes a variable that every actor in the industry seeks to control. The conclusion of this short analysis is that time-sensitiveness is probably the most useful tool in the GVC framework but necessitates further empirical investigation and theoretical elaboration in order to determine whether it suffices to explain the strong tendency toward vertical integration in port container industry over the last decades.

The tools devised by GVC analysis, expanding upon transaction costs theory in order to incorporate coordination into their model, do not seem suitable for explaining the case under scrutiny in this article. Port container industry is puzzling in that it has concomitantly become more standardized and integrated. It thus paved the way for a reassessment of transaction costs theorists idea that materiality is the main factor in determining the governance form within transportation systems. Although there is evidence for a higher level of integration in bulk and breakbulk trades, as well as no logical ground to rule out this line of reasoning straight, the case of the container port industry demonstrates that a series of alternative mechanisms is to be considered in order to properly account for it. I take up such a task in the last section of this article.

Theoretical insights for transportation in global value chains: some propositions

There are, I contend, two different ways of carrying out the task of expanding GVC theoretical framework in order to make it suitable for the investigation of transportation, and especially container port industry, within global production networks. One could first consider to incorporate ideas from outside the field in order to broaden its analytical lens. The second option would consist in refining existing assumptions to contribute to a fuller understanding of the case. The following discussion is to be considered a “theorizing effort” (Swedberg 2016) in that it offers an

⁹ Worth noting is that this issue is of paramount importance for shipowners using reefer containers filled with tropical fruits or other perishable staples. Congestion for them is synonymous with substantial losses

experimental essay at grasping the logic of the case at an early stage of the research process, as first hypotheses must be formulated to delve into the data. The approaches I suggest below mostly draw on insights from the vibrant field of economic sociology.

Political embeddedness and transportation in global value chains

In line with Granovetter's discussion of transaction costs economics (Granovetter 1985:393-404), I contend here that the theoretical frameworks within GVC literature tend to overlook the embeddedness of economic actors in endorsing explanatory models whose driving forces are the nature of the transaction and the level of coordination it requires. I suggest that light be especially shed on political forms of embeddedness in order to grasp the historical shifts in container port industry. This statement relies on a twofold empirical observation, whose connection will be investigated further in the next stages of the research process. First, most of the major shipping companies in the world have maintained tight relations to the state over the last decades. The propinquity of Maersk with Danish political actors has become commonplace. In addition, Asian actors within maritime economy are often state-owned enterprises. Although these relations might be hard to trace empirically, the connection between the shipping companies, which have been trying to size control over container port industry, and the political field are to be accounted for. Second, recent cases of port acquisitions by Chinese and Middle-Eastern terminal operators across Europe have raised concerns among both the public and political actors about the threat such a tendency poses to the continent's trade independency. Controlling ports entails controlling commercial routes and thus the channels through which commodities flow from production centres to consumption centres. Giving the commonalities among their objectives, these two sets of actors might thus be somehow connected. In other words, the agenda of political actors and shipowners could have converged toward shared interests.

Accordingly, explaining the governance pattern within transportation industry necessitates further conceptualization of the link between global value chains and the political sphere. Although attempts at integrating this insight have been lately undergone in the literature (see e.g. Carter, 2018, Dallas, 2014), I argue that the conception of industries as embedded in a social space made of interrelated fields constitutes a relevant analytical strategy. Drawing on McAdam and Fligstein's theoretical contribution (Fligstein and McAdam 2015), fields are here conceived of as sets of organizations that are attuned to and interact with each other on the basis of shared understandings regarding rules and hierarchy. In this sense, shipping and container port industries are to be seen as fields in their own rights whose boundaries have evolved over time. The model provides tools

to account for such a dynamic, or at least to formulate explanatory assumption.. Fields, in absence of exogenous shocks, tend to self-reproduction: the incumbents remain the incumbents and the challengers remain the challengers. Nonetheless, fields are put into motion when they start interacting with each other within what one could call a field of fields. Companies from adjacent industries might attempt at securing a strong position within a particular industry, thereby changing the conditions under which the game is played. The state, which may as well be thought of as a field, might also try to influence what's happening in various fields by, for instance, implementing new regulation policies.

Hence, my main assumption is that the strong tendency toward further vertical integration of the container port industry over the last decades might stem from the converging agenda of shipping companies, that have respectively been trying to secure their position within global value chains or to keep control over the main trade routes that ensure the provision of commodities to the continent. In this way, the state would have backed companies whose strategies consisted in buying out assets that were considered pivotal enough not to fall in the hands of other major actors in international trade. The concept of *thalassocracy*, which was coined by ancient Greek philosophers and that refers to the power coming from the control of the sea (Knapp and Knapp 1993; Starr 1955), might be applied to this specific case in order to conceptualize the specific form of political embeddedness on which the container port industry relies. Nonetheless, this perspective has, I contend, two main flaws. First, it remains quite difficult to operationalize in empirical research since it touches upon a delicate topic, that is, the relationship between the state and big companies. Second, even though it seems to provide an explanation for the magnitude of the wave of acquisitions that started back in the nineties, it doesn't spell out why shipping companies have been so eager to integrate stevedoring activities. The next section precisely addresses this issue.

Expanding the model: coordination and time-sensitiveness in container port industry

In this section, I will take up the task to develop and to theorize around the notion of time-sensitiveness in order to incorporate it into an expanded version of GVC analysis that may be suitable for the investigation of container port industry. The key flaw of the model laid out above, I argue, lies on the definition of complexity upon which it relies. Complexity is indeed defined in relation to the degree of codifiability of the knowledge underpinning transactions. In the container port industry, information is highly standardized and does not entail specific coordination issues. My argument here is that the complexity of transactions in the case under scrutiny might rather stem from the ups and downs of international trade flows. These ups and downs affect

transportation chains by generating temporary congestion around pivotal nodes within the production network, which in turn threaten the ability of actors to coordinate their action and to manage time in the most efficient manner. In other words, there is an exogenous form of uncertainty causing capabilities management issues of paramount importance.

Complexity in container port industry is thus mostly relevant to shipping companies on the ground that they need to figure out the best course of action to get their cargoes handled in time in periods of intense international trade activity. From a more theoretical and general standpoint, transportation segments of global value chains, I argue, pose specific coordination issues due to the fact that they do not only consist in moving the goods but also capabilities in an orderly fashion under conditions of uncertainty. Shipping companies, for instance, have to make decisions regarding where to send their vessels in order to avoid scheduling problems that might result in substantial losses due to the high costs of operating these sea giants. This might create incentives to integrate loading and unloading, as well as further activities along the chain, even though struggles over terminal assets control are likely to concentrate around specific and short moments.

In order to provide a fuller understanding of transportation, GVC analysis, I contend, is to pay attention to the political embeddedness of the economy and to the specific stakes of logistic activities. Although further empirical investigation needs to be conducted, the case of container port industry demonstrates the necessity of using flexible analysis grid to understand how governance patterns are shaped along production networks (Ponte and Sturgeon 2014). Finally, it puts emphasis on the fact that standardization and codification are not the only sources of complexity inciting companies to integrate further stages of the production process. Coordination issues might also stem from seemingly simple transactions that rely on capital availability during short spans of time characterized by intense activity. It is here suggested that the increase in containership size over the last decades, that is, in the volume of capital implied in each transaction with stevedoring companies, has largely contributed to accentuate the issue¹⁰. The more is at stake, the higher the incentives to seize control over a given stage of the production process. The question that arises then is that of determining whether such a mechanism could be applied to cases outside the realm of logistics.

¹⁰ Some authors also point out that further increases in vessels size might have negative effects on congestion problems (Cullinane, Khanna, and Song 1999).

Conclusion

This article started from the statement that GVC scholars have paid little attention to transportation issues. Although such a choice is justified on the ground that freight rates have been constantly declining since the end of the World War Two, I have shown that it constitutes a relevant research site to discuss existing theories of chain governance, as well as an empirical phenomenon that deserves attention in its own right due to globalization still consisting in moving the goods all over the world. Especially, the data I presented suggest that the growing standardization and codifiability of transactions within the container port industry has not led to the domination of arm's length market relationship between stevedores and shipping companies as it could have been predicted by the theory. I suggested that the puzzle be put together by taking into account political embeddedness and by expanding upon the idea of time-sensitiveness in a highly capitalized industry.

One of the main tenet of the article, drawing on insights from the new economic sociology, is that GVC analysis should not endorse the mainstream economics strategy consisting in devising all-encompassing theoretical tools but instead juggling theories in order to grasp the logic of the case in a more accurate manner. From this standpoint, it seems that transportation and production activities may not be approached through the same lenses, though they belong to common production networks. Looking at logistics indeed entails to take into consideration that moving goods relies on the capacity of moving goods and capabilities at the same time and that international trade is a major political stake for states. This article constitutes in this way a first attempt to build an economic sociology of transportation industries that could be enriched by global value chains analysis.

References

- Bair, Jennifer. 2008. "Analysing Global Economic Organization: Embedded Networks and Global Chains Compared." *Economy and Society* 37(3):339–64.
- Birtchnell, Thomas, Satya Savitzky, and John Urry. 2015. *Cargomobilities*. Routledge.
- Brooks, Mary R. 2004. "The Governance Structure of Ports." *Review of Network Economics* 3(2): 168-183.
- Bunker, Stephen G. and Paul S. Ciccantell. 2005. *Globalization and the Race for Resources*. JHU Press.

- Carter, Elizabeth. 2018. "For what it's worth: the political construction of quality in French and Italian wine markets", *Socio-Economic Review*, <https://doi.org/10.1093/ser/mwx060>.
- Cho, Hyuk-soo. 2014. "Determinants and Effects of Logistics Costs in Container Ports: The Transaction Cost Economics Perspective." *The Asian Journal of Shipping and Logistics* 30(2):193–215.
- Ciccantell, Paul S. and Stephen G. Bunker. 1998. *Space and Transport in the World-System*. Greenwood Publishing Group.
- Ciccantell, Paul and David A. Smith. 2009. "Rethinking Global Commodity Chains: Integrating Extraction, Transport, and Manufacturing." *International Journal of Comparative Sociology* 50(3–4):361–384.
- Cullinane, Kevin, Mahim Khanna, and Dong-wook Song. 1999. "How Big Is Beautiful: Economies of Scale and the Optimal Size of Containership." *Liner Shipping: What's next? : Proceedings of the 1999 Meeting of the International Association of Maritime Economists Held in Halifax, Nova Scotia, Canada, on September 13 and 14, 1999*.
- Cullinane, Kevin and Dong-Wook Song. 2002. "Port Privatization Policy and Practice." *Transport Reviews* 22(1):55.
- Dallas, Mark P. 2014. "Cloth without a Weaver: Power, Emergence and Institutions across Global Value Chains." *Economy and Society* 43(3):315–45.
- De Vita, Glauco, Arafet Tekaya, and Catherine L. Wang. 2011. "The Many Faces of Asset Specificity: A Critical Review of Key Theoretical Perspectives." *International Journal of Management Reviews* 13(4):329–48.
- Dolan, Catherine and John Humphrey. 2004. "Changing Governance Patterns in the Trade in Fresh Vegetables between Africa and the United Kingdom." *Environment and Planning A: Economy and Space* 36(3):491–509.
- Ermakoff, Ivan. 2014. "Exceptional Cases: Epistemic Contributions and Normative Expectations." *European Journal of Sociology / Archives Européennes de Sociologie* 55(2):223–43.
- Fligstein, Neil and Doug McAdam. 2015. *A Theory of Fields*. Oxford, New York: Oxford University Press.
- Gereffi, Gary. 1999. "International Trade and Industrial Upgrading in the Apparel Commodity Chain." *Journal of International Economics* 48(1):37–70.

- Gereffi, Gary, John Humphrey, and Timothy Sturgeon. 2005. "The Governance of Global Value Chains." *Review of International Political Economy* 12(1):78–104.
- Gereffi, Gary and Miguel Korzeniewicz. 1994. *Commodity Chains and Global Capitalism*. Praeger.
- Gibbon, Peter, Jennifer Bair, and Stefano Ponte. 2008. "Governing Global Value Chains: An Introduction." *Economy and Society* 37(3):315–38.
- Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 91(3):481–510.
- Gregson, Nicky, Mike Crang, and Constantinos N. Antonopoulos. 2017. "Holding Together Logistical Worlds: Friction, Seams and Circulation in the Emerging 'Global Warehouse.'" *Environment and Planning D: Society and Space* 35(3):381–98.
- Hall, Peter V. and Daniel Olivier. 2005. "Inter-Firm Relationships and Shipping Services: The Case of Car Carriers and Automobile Importers to the United States." *Maritime Policy & Management* 32(3):279–95.
- Haralambides, Hercules E., Pierre Cariou, and Marco Benacchio. 2002. "Costs, Benefits and Pricing of Dedicated Container Terminals." *International Journal of Maritime Economics* 4(1):21–34.
- Hesse, Markus and Jean-Paul Rodrigue. 2004. "The Transport Geography of Logistics and Freight Distribution." *Journal of Transport Geography* 12(3):171–84.
- Kaselimi, Evangelia N., Theo E. Notteboom, and Bruno De Borger. 2011. "A Game Theoretical Approach to Competition between Multi-User Terminals: The Impact of Dedicated Terminals." *Maritime Policy & Management* 38(4):395–414.
- Knapp, A. B. and A. Bernard Knapp. 1993. "Thalassocracies in Bronze Age Eastern Mediterranean Trade: Making and Breaking a Myth." *World Archaeology* 24(3):332–47.
- Midoro, R., E. Musso, and F. Parola. 2005. "Maritime Liner Shipping and the Stevedoring Industry: Market Structure and Competition Strategies." *Maritime Policy & Management* 32(2):89–106.
- Notteboom, Theo E. 2002. "Consolidation and Contestability in the European Container Handling Industry." *Maritime Policy & Management* 29(3):257–69.
- Notteboom, Theo and Jean-Paul Rodrigue. 2012. "The Corporate Geography of Global Container Terminal Operators." *Maritime Policy & Management* 39(3):249–279.

- Palay, Thomas M. 1984. "Comparative Institutional Economics: The Governance of Rail Freight Contracting." *The Journal of Legal Studies* 13(2):265–87.
- Parola, Francesco and Enrico Musso. 2007. "Market Structures and Competitive Strategies: The Carrier–stevedore Arm-Wrestling in Northern European Ports." *Maritime Policy & Management* 34(3):259–78.
- Pelizzon, Sheila. 1994. "The Grain Flour Commodity Chain, 1590-1790." pp.34-47 in *Commodity Chains and Global Capitalism*, edited by Gary Gereffi and Miguel Korzeniewicz. Praeger.
- Ponte, Stefano and Peter Gibbon. 2005. "Quality Standards, Conventions and the Governance of Global Value Chains." *Economy and Society* 34(1):1–31.
- Ponte, Stefano and Timothy Sturgeon. 2014. "Explaining Governance in Global Value Chains: A Modular Theory-Building Effort." *Review of International Political Economy* 21(1):195–223.
- Poulsen, René Taudal, Stefano Ponte, and Henrik Sornn-Friese. 2018. "Environmental Upgrading in Global Value Chains: The Potential and Limitations of Ports in the Greening of Maritime Transport." *Geoforum* 89:83–95.
- Riordan, Michael H. and Oliver E. Williamson. 1985. "Asset Specificity and Economic Organization." *International Journal of Industrial Organization* 3(4):365–78.
- Rodrigue, Jean-Paul and Theo Notteboom. 2009. "The Terminalization of Supply Chains: Reassessing the Role of Terminals in Port/Hinterland Logistical Relationships." *Maritime Policy & Management* 36(2): 165-183
- Rodrigue, Jean-Paul, Theo Notteboom, and Athanasios A. Pallis. 2011. "The Financialization of the Port and Terminal Industry: Revisiting Risk and Embeddedness." *Maritime Policy & Management* 38(2):191–213.
- Schoenberger, Erica. 1994. in "Competition, Time, and Space in Industrial Change" *Commodity Chains and Global Capitalism*, edited by Gary Gereffi and Miguel Korzeniewicz. Praeger.
- Soppé, Martin, Francesco Parola, and Antoine Frémont. 2009. "Emerging Inter-Industry Partnerships between Shipping Lines and Stevedores: From Rivalry to Cooperation?" *Journal of Transport Geography* 17(1):10–20.
- Starr, Chester G. 1955. "The Myth of the Minoan Thalassocracy." *Historia: Zeitschrift Für Alte Geschichte* 3(3):282–91.

Sturgeon, Timothy J. 2002. "Modular Production Networks: A New American Model of Industrial Organization." *Industrial and Corporate Change* 11(3):451–96.

Swedberg, Richard. 2016. "Before Theory Comes Theorizing or How to Make Social Science More Interesting." *The British Journal of Sociology* 67(1):5–22.