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Special issue WCTRS SIGA2 2016: Infrastructure, pricing and regulatory issues in maritime supply chains

This special issue groups a number of relevant publications presented within the Special Interest Group A2 (Ports and Maritime) sessions at WCTRS (the World Conference on Transport Research Society) 2016 Shanghai. What they have in common is that they deal with critical elements in current supply chains. Equally, they share the characteristic that they provide innovative approaches, not only scientifically, but also with strong relevance to business practices. All papers come up with clear advice and recommendations for business and/or policy. Related to that, a number of the papers also make good use of datasets available throughout the chain, which have often remained underutilized to date. Moreover, all together, they cover the full spectrum of infrastructure, pricing and regulatory issues that can impact supply chains. Finally, they span the range of sustainability issues, covering profit (e.g. efficiency and optimization), people (e.g. potential and impact of automation), and planet (e.g. environmental cost savings).

The first contribution, by Cantillo et al., deals with port choice as part of a full supply chain solution. Too often indeed, port choice has been considered in isolation, detailing the factors in play for specific ports. Very often, these criteria cannot be generalized to other continents or contexts. Moreover, they often did not take into account the interplay with what happens before and after the port call. The authors of this paper apply econometrics to establish such relationship. And indeed, they find out that a number of factors relating to other chain sections impact on port choice. These factors are sometimes more macro-related (e.g. trade agreements and GDP per capita), and sometimes really micro (e.g. land transport costs). It is important that such analysis when executed transcends the individual country level. This is not only because each country and in particular continent is substantially different, but also because more and more, individual port settings do not remain stable but change because of changing strategies, policies and circumstantial factors.

Yifei et al. focus on the maritime part of the supply chain, and in particular on containers. The freight rates they deal with are again essential components of supply chain selection. They are the results of demand and supply. Supply can be split between micro issues (e.g. operational cost structures) and market issues (e.g. number of suppliers and level of competitiveness). The authors mainly focus on the use that can be made of freight rates as aggregated in an index. To do that, they make innovative use of the large sets of data available in e-booking platforms. Their index is useful not only for improving supply chain decision making, but also for hedging purposes once the choice of supply chain has been made.

A next group of papers focus on the ports themselves. Gumede and Chasomeris keep an eye on the chain impact, by focusing on the interesting topic of pricing, just like the preceding paper. They show, with a case study for South Africa, how in practice certain commodity types and certain types of users enjoy cross-subsidization through revenue from other commodity and user types. In general, they find out that vessel charges are below the benchmarked means, whereas port terminal operators with a concession as well as cargo owners are subject to higher than benchmarked tariffs. Depending on who in the chain makes the ultimate decision, this may seriously impact on the ports' attractiveness: if cargo owners make the chain decision, then having them cross-subsidize shipping lines does not help in attracting them to the considered port. Furthermore, vessel rates disfavour containerized cargo, which is generally higher-value, and favours lower-value cargo types. This is not in the interest of a country like South-Africa that intends to upgrade its society and in particular the type of economic and production activities it hosts. These findings therefore elaborate on earlier research that has shown that port pricing too often is seen as a way to raise money for the port authority, without clear rationale, let alone economically sound principles that back it, like marginal cost pricing for instance.

Yu et al. take a look at the physical aspects of the port, and in particular container terminal organization. A wide literature on port terminal optimization is already available. However, the authors add scientific and business value by showing the importance of good container positioning on the terminal for increasing terminal productivity, and in particular that of container cranes. Just like the paper by Yifei et al., they make use of real-life data sets available in port systems, in this case terminal operating systems. Their findings are useful for terminal design and management.

Where the previous two papers dealt with pricing respectively, the paper by Acciaro et al. deals with the third key aspect: regulation. More particularly, it verifies what combinations of conditions are needed to make innovation in ports successful. The conditions encompass introducing the right infrastructure and equipment, regulation and standardization, networking and capacity provision. The authors apply Qualitative Comparative Analysis as a method, which is original in the port field, but very suitable. The method allows dealing with sets of cases, which are insufficient to derive data series that can be applied in econometrics, but at the same time obtain more information than can be derived from single case studies. The results show that regulation plays a strong role, both to ensure a level playing field as well as to create standardization among suppliers. Equally, the study pleads for stronger networking among the partners, which implies they should team up in developing innovation and in setting standards. The findings are very valuable to business practice, as innovation is the key area for ports to distinguish themselves from competitors. Most ports seem to have understood this in the meantime, but not all are aware of the path to reach successful innovation. Therefore, a lot of time and money may be wasted in projects which are doomed to fail, because of the nature of the initiative, the setting, strategies or costs. It is important to be aware of those determining factors.

The last two papers of this special issue turn to the last component in the chain: hinterland transport. The hinterland is increasingly the key battle area for ports, and has grown into the most costly part of a full supply chain. The latter is because the maritime share in total chain costs has decreased due to increasing vessel sizes, bringing economies of scale, also at port. Costs have remained stable in the chain share. It is the hinterland that has been unable to decrease its absolute cost, and which saw its chain share increase. The solution here again is innovation, but also better use of existing capacity. For the latter, one looks particularly in the direction of the 'alternative' modes, like rail and barging. Ambrosino et al. apply simulation to see where best rail infrastructures and intermodal hubs can be installed in the hinterland, so as to maximize economic efficiency and minimize negative externalities. Therefore, the environmental sustainability dimension gets explicit attention in this paper. They apply simulation to obtain such results.

The final paper, also in the hinterland group, is by Hintjens. He calculates the potential for modal shift in hinterland flows, by applying cost simulation, combined with a market analysis. With the latter, he identifies to which destinations or from which origins in the hinterland enough cargo is being transported by road, so that a critical mass is reached under which a train or a barge could operate profitably. Bundling cargo flows namely is the prime condition for generating enough cargo volumes for these 'alternative' transport modes. Again, the objective is to achieve a combination of economic efficiency and overall sustainability, with less emissions and congestion. The contribution is conceptual, but provides an exhaustive framework for port authorities, rail operators, shippers and governments to visualize the potential for modal shift.

With this set of contributions, the special issue is a must-read, not only for scientists who want to see a variety of methods applied in a new transport sub-context, but also for practitioners and policy-makers. The papers can help them make well-judged and scientifically-supported decisions throughout the supply chain, knowing that whatever their choice and focus, they will always impact on other segments of the chain.

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