

SP-2007-18

THE IMPLICATIONS OF FREIGHT LOGISTICS FOR URBAN DEVELOPMENT AND SUSTAINABLE FUTURE TRANSPORT

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FEBRUARY 2008- JUNE 2010

1. INTRODUCTION

Much thinking on future urban transport involves commuting and personal travel, and has begun to emphasise the benefits of higher density residential development. However, there are other important transport uses. These include logistics arrangements to move freight. These activities have a direct effect on future transport as they compete for the use of roads and railways, and require land-extensive local infrastructure. They also shape commercial location, so can redistribute jobs and can contribute to changes in the location of the housing, which in turn can change transport patterns. Hence to promote and sustain an ever-evolving transportation system in a large urban area it is essential to have an understanding of current and likely future freight movement. This project set out to identify the ways that logistics systems influence current and future urban transport.

2. ESTABLISHING A GLOBAL PERSPECTIVE

The initial step was to develop an understanding of the location of the major concentrations of logistics activity in the world. Research established that the global movement of sea and air freight was concentrated in a small number of the major urban regions of the world (O'Connor 2010a). In fact just 44 major urban regions (labelled global city regions) account for around 50% of the freight moving across the globe in 2006, and that concentration has increased since 1996. Closer study found that the activity was especially concentrated in regions with multiple sea and airports. Jovanovic and O'Connor (2010) showed concentration applied especially in the case of air freight. Hence a space extensive activity needing sites for its infrastructure (sea and airports), its connections (road and rail networks) and its organisation (warehouses and distribution centres) is competing for sites within already crowded (and expensive) urban regions.

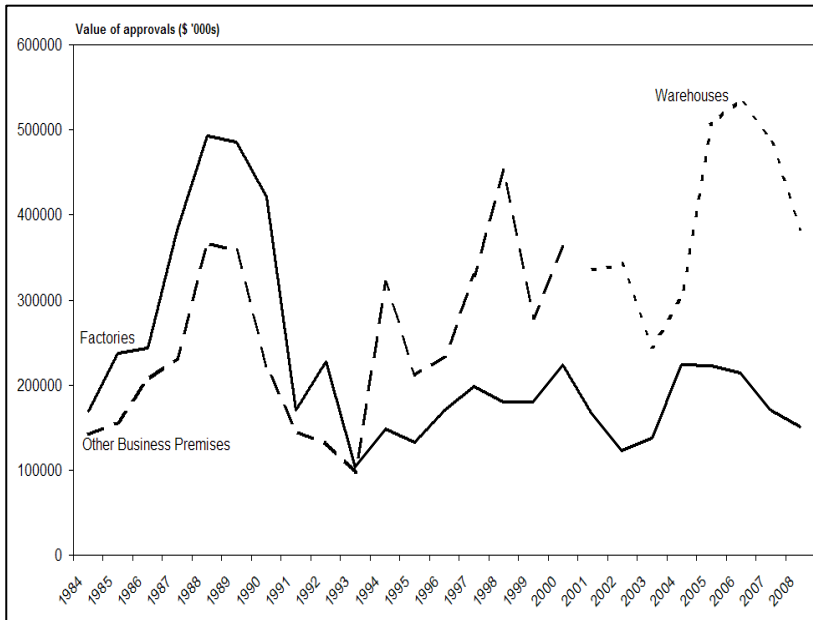
3. CONCENTRATION OF LOGISTICS ACTIVITY IN ESTABLISHED AREAS: SINGAPORE

The second stage of the research involved analysis of how the pressure of this concentration of freight movement has been felt in the spatial development of metropolitan areas. The traditional focus of this activity has been around the original airports, seaports and rail terminals; the later two are usually located close by the CBD. In some metropolitan areas, local planning efforts have emphasised the renovation (and more intensive use) of these existing facilities. That approach can be seen in the ports of Hamburg and Antwerp and the airports of Chicago and London. In Singapore, too, there has an extension of the port just a short distance to the west, while the airport has undergone upgrading. Analysis of the location of logistics service firms showed a continued concentration around the original port area, while the warehouses and storage facilities in a case study of a logistics management company were located closer to the port extension and around airport. All these buildings were multi-storey. Hence in Singapore absolute land scarcity has led to more intensive utilisation of ports and the airport and has limited the dispersal of warehouses and distribution centres. (O'Connor 2010b).

4. DISPERSAL OF LOGISTICS ACTIVITY: MELBOURNE

However in most metropolitan areas the growth in the volume of logistics activity (and some changes in its organisation) has shifted the preferences of the activity away from established locations. Although proximity to major gateway ports and airports is still favoured, "... the cost, congestion, limits on hours of operation and lack of availability of buildings that can accommodate the new preferences of the industry are expressed in preferences for business

park type locations” (CapGemini and Prologis 2006: 29). Longer distance dispersal to inland distribution centres involves logistics facilities in smaller towns and cities (connected by rail and road) well away from the sea and airports. These outcomes were labelled “freight sprawl” in the New York Metropolitan Region (de Cerreño 2008:3). Consequently, even though port or airport location may not change there can be dispersal of new warehouse space in the outer suburbs, fringe and inland regions surrounding many metropolitan areas. This outcome has been accelerated where new airports (Osaka, Hong Kong, Denver), new seaports (Shanghai) and new rail terminals (UP Global, Chicago) have been built on the outskirts of metropolitan areas.



Melbourne houses Australia’s major container terminal, and its second most important air cargo facility. It is also an important manufacturing centre. Over time manufacturing has declined in relative importance as competition with lower cost countries has reduced local firms’ viability. A consequence has been the shift to imported goods. One result has been a steady shift toward the construction of warehouses at the expense of factories (Elliott and O’Connor 2010). This outcome has a clear spatial focus. The western suburban region (with best access to the port) and northern suburban (airport) region together accounted for 55% of the total value of warehouse construction in Melbourne between 2001 and 2009 but just 30% of factory

construction, illustrating the strength of the dispersal of warehouse activity in Melbourne. This illustrates the way that logistics expansion has been associated with urban dispersal.

5. SUMMARY



The research to date has established that logistics activity has been growing rapidly and has been concentrating in major cities. The local impacts depend on the way that logistics facilities are designed and located. The common outcome is for facilities to occupy large sites in long and low buildings. Experience in Singapore however shows that this is not the only way to manage space for logistics and high density solutions are possible. That approach is probably only likely to be adopted where local land costs are very high. Elsewhere it will become necessary to find better ways to manage the currently long links between port/airport and warehouses and distribution centres. As fuel costs rise, and truck traffic and road congestion worsen, these urban planning pressures will intensify. Subsequent research in this area will address these outcomes.

6. REFERENCES

- CapGemini and Prologis (2006) Warehousing space in Europe: Meeting Tomorrow's Demand. http://www.de.capgemini.com/m/de/tl/Warehousing_space_in_Europe_meeting_tomorrow_s_demand.pdf
- de Cerreño, A.L.C., Shin, H-S. Strauss-Wieder, A. and Theofanis, S. (2008) *Feasibility of Freight Villages in the NYMTC Region*. Center for Advanced Infrastructure and Transportation Freight and Maritime Program, Rutgers, The State University of New Jersey and NYU Rudin Center for Transportation and Management
- Elliott, P. and O'Connor, K. (2010) *Logistics and Urban Change in Western Melbourne Research in Progress*.
- Jovanovic, D., and O'Connor, K (2009) *Air Freight and Airports: A Global Study*
In Wang, D. and Li, S-M. (eds) *Transportation and geography*. Proceedings of the 14th Hong Kong Society for Transportation Studies International Conference. Hong Kong.. Vol. 1 pages 19-28, available at <http://home.netnavigator.com/-hksts>.
- Notteboom, T., and Rodrigue, J-P (2004) *Inland Freight Distribution and the Sub-harborization of Port Terminals* http://people.hofstra.edu/Jean-paul_Rodrigue/downloads/ICLSP-%20Notteboom-Rodrigue-final%20version.pdf
- O'Connor, K (2010a) *Global City Regions and the Location of Logistics Activity*, *Journal of Transport Geography*. 18, 354-362. doi:10.1016/j.jtrangeo.2009.06.015
- O'Connor, K. (2010b) *High Density Approaches to Accommodating Logistics Activity in Cities: a case study of Singapore*. Paper presented at GAMUT International Conference "Sustainable Transport in the Asia-Indo-Pacific: Varied Contexts – Common Aims" June 2010.

7. OUTPUT OF THE PROJECT

Refereed Journal Article:

- O'Connor, K (2010) *Global City Regions and the Location of Logistics Activity*, *Journal of Transport Geography*. 18, 354-362.

Student Thesis:

- Jovanovic, D (2009) *Air Freight and Airports: a Global Study*. Thesis submitted as part of a Master of Urban Planning, Faculty of Architecture, Building and Planning, University of Melbourne.

Conference Papers

- Jovanovic, D., and O'Connor, K (2009) *Air Freight and Airports: A Global Study*
Paper refereed and accepted for 14th International Conference of the Hong Kong Society for Transportation Studies, Hong Kong. December
- O'Connor, K (2008) *Global Logistics Regions: A New Outcome in World Sea and Air Logistics?* Paper presented to North American Regional Science Association Conference. New York November. (Subsequently revised and submitted as journal paper)
- O'Connor K., and Jovanovich, D (2009) *Air Freight and Global Logistics Regions*. Paper presented to the American Association of Geographers Conference Las Vegas March
- O'Connor, K., Holly B., and Clark, A (2009) *Logistics Services, Metropolitan Areas and the Transport Task. Some Preliminary Insight for the US*. Paper presented to the Pacific Regional Science Association Conference. Gold Coast. Australia. July.

Research in Progress

- Elliott, P and O'Connor, K (2010) *Logistics and Urban Change in Western Melbourne*. Paper to be presented at the *Australian Road Transport F Road Transport Forum* September 2010.