

Maritime transport and globalization: evolving relationships

Riassunto. - L'evolversi dei rapporti fra trasporto marittimo e globalizzazione

I rapporti fra globalizzazione e trasporti sono al tempo stesso intensi ed ineguali. In quanto domanda derivata, i servizi di trasporto ricevono un impatto, sotto molti fondamentali punti di vista, in seguito a processi che divengono sempre più globali. I trasporti containerizzati si conformano alle attese generate dalla globalizzazione, e in particolare all'allungamento e all'intensificazione dei collegamenti, nonché alla crescente omogeneizzazione, mediante dimensioni spaziali ineguali e differenziate da regione a regione. È viceversa possibile che la globalizzazione venga a sua volta plasmata dal trasporto containerizzato. Per comprendere l'effettivo svolgimento dei processi generali occorre in conclusione tener presenti le diversità locali, che su questi processi esercitano un indubbio impatto.

Introduction

Globalization is a term that is so widely used today that its meaning is hard to define with any degree of clarity. For example, a recent book provided 35 different definitions of the term (Streeten 2001, 173). Despite it being a word so overused that its meaning has become obscure, it is evident that the process of globalization has drawn the academic interest of a very wide range of disciplines. Globalization is recognised in the economics and business literature as promoting the financial and commercial expansion of a world economy that has become increasingly integrated. From manufacturers whose raw materials come from all around the world and who produce and

sell their products in an international marketplace, to the banks and financial institutions that move capital between continents, the contemporary economy seemingly knows no boundaries. This process is also recognised in the fields of politics, where global issues shape the relationships between states (Dunn 1995), in the environment, where many forces of change are seen to be at a planetary scale, and in culture, where the influence of TV, cinema and the Internet are diffused across the globe (Friedman 1994, Scott 1997). Even terrorism has gone global, thanks to Al Qaeda, and the recent outbreak of SARS is a further clear signal of globalization!

From a wide set of disciplinary studies, several key features of globalization emerge. First there is a spatial expansion of linkages. Industrialists assemble components from around the world (Dicken 2002), and political relationships between States have been stretched (McGraw & Lewis 1992). Second, there has been a growing intensity or deepening of linkages of all kinds, from the commercial to political and cultural. Third, there is a growing homogeneity of relationships. In cultural and communication studies, for example, globalization is seen by some as a force for standardisation and homogeneity. The threat of American cultural hegemony is seen to arise out of such global communications technologies as television, movies and the Internet. In commercial and industrial relationships similar consequences arise. Companies serving global markets adopt standardised operational and marketing procedures that allow them to carry on business in disparate regions (Dicken 2002).



It should come as no surprise that the transport industry too has been shaped by globalization. As a derived demand, transportation must inevitably reflect changing patterns of commercial and industrial relationships. Container shipping has been particularly affected by the forces of commercial globalization. In this paper the adjustments made by container shipping in response to globalization pressures are explored. It examines the extent to which the three broader effects of globalization are evident. The paper goes on to analyse the limits to globalization in container shipping and to suggest that the relationship is much more complex than considered at first sight.

The restructuring of container shipping

The globalization of the economy has resulted in a great expansion of international trade. During the last twenty years international trade has been growing at a rate significantly higher than production. At the same time, new markets have been opened up, most noticeably in East Asia but also in South America and South Asia. Container shipping, which is the mode that best serves these new trade opportunities, has had to respond by increasing capacity on existing trade routes and extending services into new market areas. Fifteen years ago the large majority of the world's container trade was between Japan, North-West Europe and North America. Today, the pattern is global.

While representing significant opportunities, the need to expand capacity and provide global services has placed enormous pressures on the shipping lines. Most of the established lines were in no position to respond to the changes by the 1990s. Some failed commercially, others withdrew from mainline container operations, but those that have remained found it advantageous to join with erstwhile competitors to invest in new and larger vessels in order to add capacity and to extend services in new market areas (Brooks 2000).

Two main forms of association between the lines became evident. Many of the carriers seeking to provide global services came together to form strategic alliances. Four major groupings emerged in the 1990s: Grand Alliance, made up of Hapag-Lloyd, P&O-Nedlloyd, NYK, OOCL and MISC; New World, comprising APL, MOL, and Hyundai; United, with Hanjin, DSR and Cho Yang; and, SeaLand with Maersk. A looser alliance emerged in the late 1990s between K-Line, Yangming and COSCO. These alliances were made up, therefore,

of most of the major container shipping companies. By pooling vessels members could offer a broader set of services than would be possible by acting independently (Midoro and Pitto 2000).

At the same time, and sometimes overlapping the formation of the alliances, there took place a number of mergers and take-overs. Maersk eventually took over its alliance partner, SeaLand to create the world's biggest carrier; NOL purchased the assets of APL and re-named the new firm, APL; P&O merged with Nedlloyd; Hanjin acquired DSR; CMA bought CGM; and, CPShips bought CAST, Lykes, Contship, TMM and ANZDL. In all cases the new enlarged firms could deploy extra capacity (ships) and serve new markets. The result has been a growing concentration of ownership in container shipping. Between 1990 and 2000 the top twenty carriers have seen their share of container capacity increase from 25% to nearly 60%. In addition, most of these top carriers are also members of alliances that provide joint services around the world.

Impacts on container shipping

The impacts of these structural changes in the container shipping industry are considered in the context of three expected outcomes: the degree of spatial expansion, the intensity of linkages, and the trend towards homogeneity. These outcomes are examined by considering in turn three dimensions of container shipping: (i) the network of shipping services, (ii) the vessels deployed, and (iii) the ports served.

(i) Shipping services

Research by Slack *et al.* (2002) compared the services of the alliance members prior and subsequent to the formation of the alliances. This research shows that the number of services increased from 422 to 545 between 1989 and 1999 (see Fig. 1). More remarkable is the growth in weekly services, which expanded from 210 to 400 over the same period. These results suggest that while the alliances enabled carriers to offer more services, the major impetus was to enhance service frequencies to at least one sailing per week on a greater range of routes. This result confirms the hypothesis that globalization produces an intensification of linkages.

The increase in the number of services took place in conjunction with a spatial restructuring of the networks. Analysis of the connections reveals striking contrasts between pre-and post alliance-



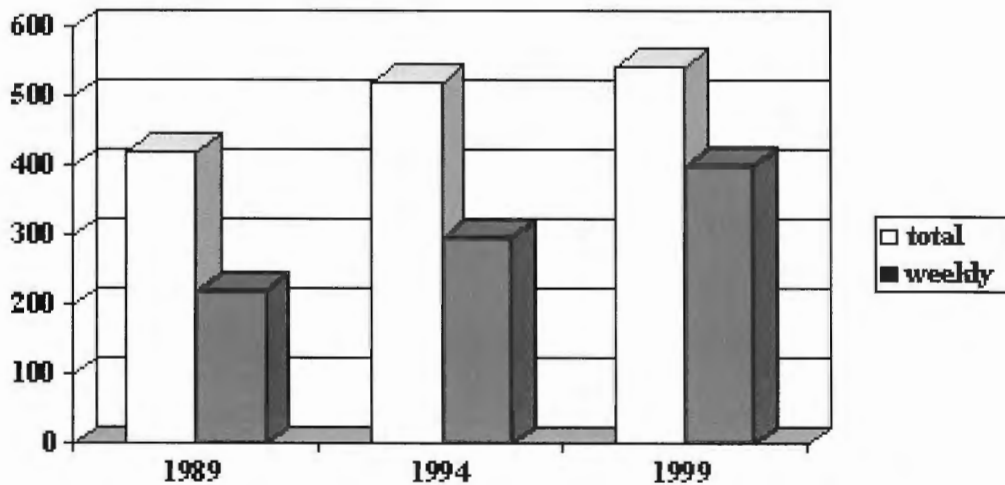


Fig. 1. Growth in container services, 1989-1999.

formation periods. Prior to the alliances shipping lines tended to focus their networks from their home range, with services that were end-to-end, that is to say went to other ports on another maritime range across one ocean. Furthermore the routings were largely East-West, linking the major markets of Japan, Europe and North America (Fig. 2). Each line had a different profile.

By 1999, however, the market coverage had become global. This is reflected in the number of different major market areas served. If the world is divided into 13 maritime ranges, in 1989 the lines that were to join together in one of the alliances served an average of 7.3 ranges. By 1999 an average of 10.3 ranges were being served (Slack *et al.* 2002). The service networks too evolved in a more complex fashion. Instead of end-to-end services, by 1999 the networks were multi-range, linking several continents with interdependent services (Fig. 3). Network elaboration and a lengthening of routes appears to have been the dominant feature. The observed increase in the scope and scale of container shipping linkages confirms another of the expected outcomes of globalization.

(ii) Vessels

It has long been recognised that container shipping benefits from scale economies. The history of container shipping has been one of a gradual increase in vessel capacity. However, there existed two main constraints. The dimensions of the Panama Canal exerted a specific limit on vessel beam and draught, resulting in the so-called Panamax vessels of approximately 4,000 Teus, the largest ships that were able to pass through the canal. This size limit was reached in the 1980s. The sec-

ond constraint was that in order to achieve maximum scale economies, the larger vessels had to be filled to capacity, and in the competitive world of container shipping, individual lines could rarely meet this requirement, and hence were reluctant to invest in ever larger ships.

The log jam was broken in the 1990s. After being held to Panamax dimensions, more and more lines sought to invest in the more economic post-Panamax ships, and since the early 1990s there has been a significant increase in vessel size (Fig. 4). This was greatly facilitated by the emergence of alliances, whereby the largest vessels could be allocated to alliance services, so that a pooling of cargoes could ensure higher load factors per sailing. At the beginning of the Twenty-first Century a major question is how big will ships become? It is a question that is resulting in a lot of academic debate (Gilman 1999, Cullinane & Khanna 2000). While there are differences of opinion on how big ships will become, there is a general consensus that the limits of size have not yet been reached.

The growth in the size of ships is not the only facet of increased capacity in container shipping. Between 1989 and 1999 the number of container ships operated by the alliance members increased from 728 to 1100 (Fig. 5) (Slack *et al.* 2002). While many of the new ships brought into service were of post-Panamax dimensions, and were deployed on the main East-West trade routes, their deployments allowed many of the *existing* sub-Panamax ships to be re-positioned to serve newer and smaller markets. Consequently there has been a great deal of upscaling in container shipping on a global basis. All markets and all trades have been impacted by the growth in vessel size.



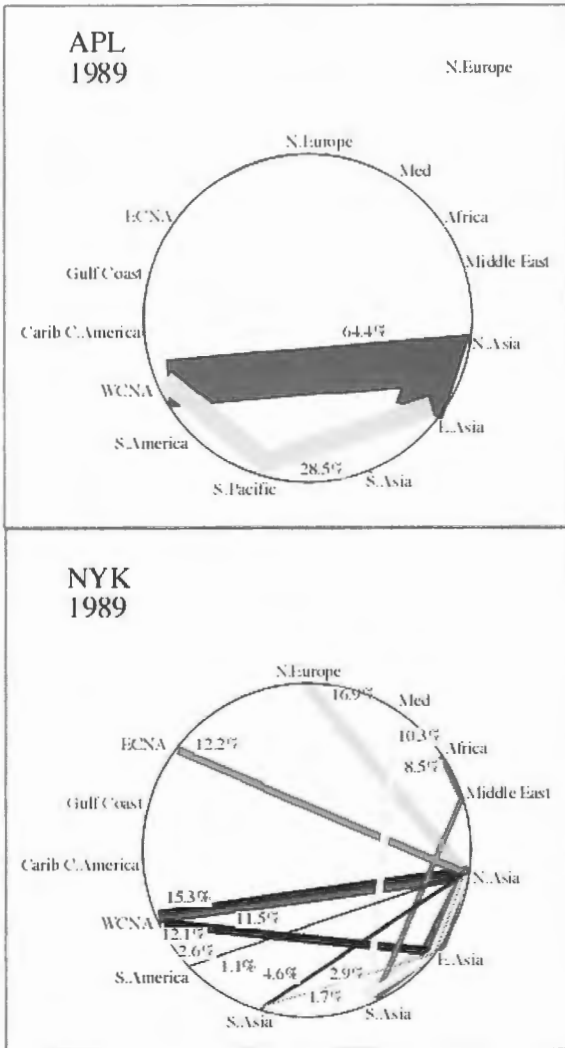


Fig. 2. Networks in 1989: regionally concentrated and end-to-end.

(iii) Ports

The choice of ports of call is directly related to how the carriers seek to exploit markets. The changes made to container shipping networks over the last decade of the Twentieth Century have inevitably impacted on port selection. Expansion into new markets has added new ports, and on ranges where service is maintained, new joint services have brought about a rationalisation of port selection. The late 1990s were a period of significant change and adjustment for the carriers' services. Table 1 summarises the changes for a sample of carriers. The most impressive feature is the scale and magnitude of the shifts in ports of call that took place in a very short time. In a five year period, HMM added 43 new ports to its schedule, while maintaining service to 24 and dropping only

10 ports. A similar pattern is repeated by OOCL. Conversely alliance co-member, MOL ceased service to 57 ports, while adding only 47. Companies that underwent equity mergers during the period as well as alliance membership experienced some of the largest adjustments. P&O added 106 ports to its network and APL added 71, both increases being greater than the number of ports retained between 1994 and 1999. This leads to the question as to whether the mergers led to the increases. In the case of P&O, it appears that the merger with Nedlloyd was an important factor in the addition of ports, because Nedlloyd had served 60 of the 106 new additions previously. On the other hand, for APL only 8 of its new ports had been served previously by NOL (Slac, *et al.*, 2002).

There appear to be two elements regarding the effects of the alliances on port selection. First, in

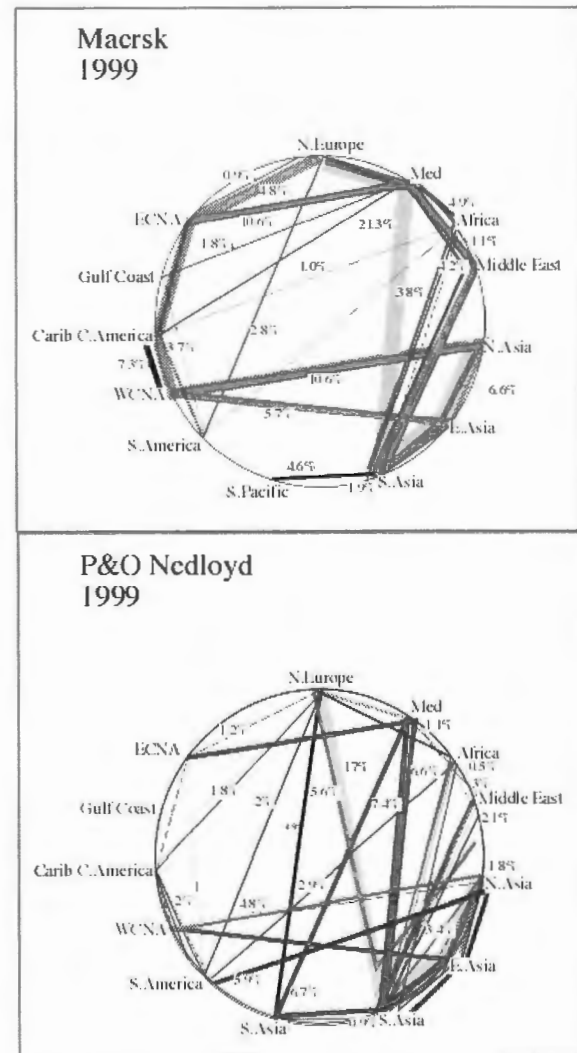


Fig. 3. Networks in 1999: global and multi-range.

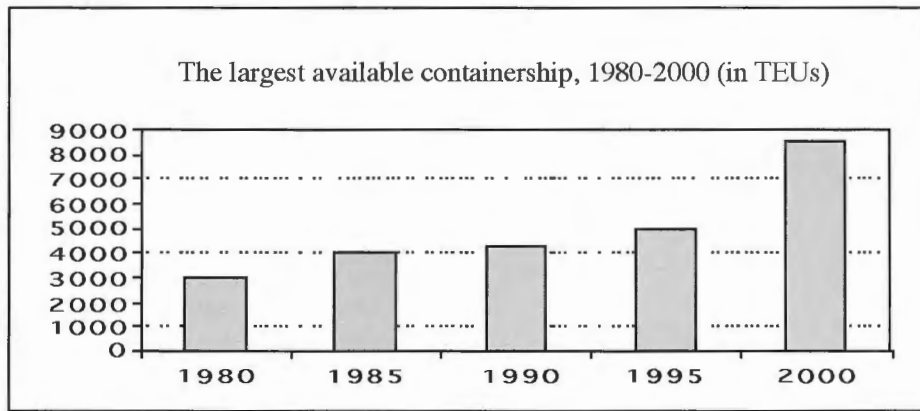


Fig. 4. Growth in the size of container ships, 1980-2000.

every case the majority of the ports included in alliance networks were previously served by the individual members. For the Japanese carriers, that were already offering services to a wide spectrum of ranges, the alliance ports were overwhelmingly part in their existing networks. For HMM, APL, MISC, DSR, Cho Yang, OOCL and Hanjin the alliance ports represented at least half the ports for which service was maintained between 1994-9, and in the case of Hanjin and HMM nearly all the retained ports were those that were part of alliance services (Slack *et al.*, 2002).

The second aspect of the alliances is that they helped open up new markets and ports. They provided every member with additional market coverage, and all the carriers added ports of call that were components of alliance networks. Examples are numerous, including MISC accessing the East Coast of North America, DSR the West Coast of North America, APL Europe, Hapag Lloyd the Far East, P&O the Pacific North-West. Of particular interest is the way the alliance services enabled carriers to tap directly into the Chinese market, replacing earlier networks based entirely on transshipments via Hong Kong (Wang & Slack 2000). A further way the alliances helped members open up new markets was that because the joint services linked the major markets, freed capacity could be allocated to establish individual services in other ranges. Thus, during the latter half of the 1990s MOL restructured its services in Japan, and MISC extended new services to the lesser markets, such as Australia.

Globalization has had a major impact on container port operations (Evangelista *et al.*, 2001). Up until the 1990s, cargo handling in most ports was managed by local interests, either directly by the port authority itself or under contract to a

local terminal operator. In the last decade a significant change has occurred. Terminal operations have become increasingly under the control of a number of globally-based firms such as Hutchison, PSA, Eurogate, SSA and CSXWT that manage or own berths in ports around the world. In other cases berths are being managed by the shipping lines themselves, such as Hanjin, K-Line and Evergreen, or by firms that may have a corporate link with shipping lines, such as APM and P&O Ports. The disappearance of locally-based firms from ship handling and berth operations has become one of the most striking developments in container shipping (Notteboom & Winkelmans 2002).

With port operations being controlled by an ever smaller number of firms, and with alliances selecting the same ports of call homogeneity appears to be becoming a well-established feature of the port industry. This homogeneity is being reinforced by the standardisation of equipment being used: the ubiquitous dock gantry cranes, the standard yard vehicles and lifting devices. This also extends to include the conformity of port landscapes. Container ports from one part of the world to another display little diversity of appearance and morphology. Chinese container ports landscapes display many similarities with others half a world away. When we add that the individual identity of each member of an alliance service is diminished, with for example APL containers being moved on New World alliance services on MOL ships and calling at Hyundai berths, and that the firms are applying standardised information and documentation processing systems, the container shipping industry as a whole can be said to be more homogeneous.



Tab. 1. Ports served by the major Alliances, 2001. Source: Containerisation International Yearbook 2002.

New World Alliance	Grand Alliance	United Alliance
NORTHERN EUROPE: Bremerhaven, Felixstowe, Hamburg Le Havre, Rotterdam, Southampton	Antwerp, Bremerhaven, Hamburg, Le Havre, Rotterdam, Southampton, Thamesport	Antwerp, Felixstowe, Homburg, Le Havre, Rotterdam, Thamesport
MEDITERRANEAN: Genoa, Marseilles, Barcelona	Barcelona, Damietta, La Spezia, Marsaxlokk, Marseilles	Gioia Tauro, La Spezia, Marseilles, Valencia
MIDDLE EAST: Aden, Jeddah, Port Said	Jeddah, Dubai	Jeddah, Khor Fakkan
SOUTH ASIA: Colombo, Laem Chabang, Port Kelang, Singapore	Tanjung Priok, Colombo, Laem Chabang, Port-Kelang, Singapore	Colombo, Port Kelang, Singapore
EAST ASIA: Chiwan, Hong Kong, Kaohsiung, Keelung, Kwangyang, Ningbo, Quingdao, Shanghai, Yantian	Hong Kong, Kaohsiung, Ningbo, Quingdao, Shanghai, Shekou, Xiamen, Yantian	Chiwan, Hong Kong, Kaohsiung, Kwangyang, Quingdao, Shanghai, Xingang, Yantian
NORTH ASIA: Busan, Hakata, Kobe, Nagoya, Shimzu, Tokyo, Yokohama	Busan, Hakata, Kobe Nagoya, Sendai, Shimzu, Tokyo	Busan, Hakata, Osaka, Tokyo
WEST COAST NORTH AMERICA: Dutch Harbor, Los Angeles, Oakland, Portland, Tacoma, Seattle, Vancouver	Long Beach, Los Angeles, Oakland, Seattle, Vancouver	Long Beach, Oakland, Portland, Seattle, Vancouver
EAST COAST NORTH AMERICA: Charleston, New York, Miami, Norfolk, Savannah	Charleston, Halifax, Miami, New York, Norfolk, Savannah	Norfolk, New York, Savannah
CENTRAL AMERICA: Balboa, Puerto Manzanillo	Balboa, Cristobal, Puerto Manzanillo	Balboa, Cristobal, Manzanillo, Puerto Manzanillo

Limits to globalization

As much as globalization is recognised by many disciplinary researchers as a process that is helping transform the world, there are many others who argue that it has limits. Evidence has been assembled to suggest that proportionately, the world economy was more open at the start of the 20th century than at the end (Irwin 1996). A great deal of social science research has concluded that the global processes impact differentially at the local or regional level. Cultural distinctiveness shapes issues or processes as varied as advertising (Hannerz 1996) and production technologies (Gertler 1997). In the environmental field we are urged to 'act locally', even if we 'think globally'. Global political and economic processes have been shown to play out differently in different States and regions.

It is widely recognised that there exists a spec-

trum of causes and effects that range at a multitude of scales between the global and the local. Many researchers from non-spatial disciplines now accept this geographical metric of globalization (Scholte 2000). In geography and urban and regional planning recognition of the regional and local dimensions of globalization has given rise to a greater critical awareness of the importance of space and scale in broad-based processes (Dunning 2000, Yussef *et al.*, 2001).

Container shipping is no exception. Each port inevitably possesses a unique site that helps enforce the particularities of the locality. Site has a profound impact on operations and performance as exemplified by the case of Hong Kong, where lack of space has given rise to particular operating conditions with high stacking densities and mid-stream transfers. In other ports, where space is less of a constraint, ground positioning of containers and even total yard automation is possible in ports



such as Rotterdam. In addition, there are many factors, such as markets and governance that combine to establish regional differentiation. Thus, in East Asia where markets are essentially coastal, boxes move very short distances by land to the ports. On the other side of the Pacific, however, a large proportion of containers move great distances to inland markets in the US from West Coast ports. These differences have a big effect in determining the role of logistics intermediaries in inland distribution systems. McCalla *et al.*, (2001) have demonstrated that logistics providers offer different kinds of services from one market to another. In terms of governance there are growing divergences in administrative structures, from the State-controlled enterprises of France to the privately operated facilities in the UK or Hong Kong. In France, despite belonging to a common economic bloc, the EU, and despite providing some of the most extensive port infrastructures in Europe, French ports languish. French port authorities, the local terminal operators and the unions have worked in the past to prevent liberalisation, and in particular the opening of French ports to international terminal management companies.

Local and regional differences in shipping networks are apparent, despite the globalised uniformities discussed earlier. Robinson (1998) has postulated a hierarchy of services in Asia, in which the locally based services operate in parallel with the mainline operations of the mega-carriers, a situation that is repeated in the Caribbean basin. As in other fields of human endeavour locational distinctiveness is still strong, and there are powerful countervailing forces that weaken global conformity.

Globalization and container shipping relationships revisited

While not disputing the position of international transport as a derived demand, a service that responds to market opportunities, a careful assessment of the situation leads to the conclusion that container shipping is helping shape globalization. There is interdependence between transportation and globalization. How could the world economy function without an efficient transportation system? Container shipping, in particular, sustains and shapes globalization. The extension of container shipping into the north-south trades has been a feature of contemporary containerisation, and while it is true that the lines are seeking to penetrate new markets, i.e. they are acting in re-

sponse to globalization, it is also clear that their entry into these areas is a fundamental precondition for global integration.

These new services, therefore, may shape the economic conditions of globalization. Yet we know very little except that many new services have been added, capacity has increased, frequency of sailings has improved, and rates have fallen. Each one of these developments has the power to produce significant changes. Local industries in these newly linked regions have greater opportunities to sell their products in regional and global markets. At the same time, however, multi-national producers gain access to formerly inaccessible markets. Which trend is dominant and why? Who benefits? Do the local shipping companies help sustain local economic vitality? Does the welfare of areas that are not included in the new global shipping networks suffer a disadvantage, or is the reverse true?

A further indication of the role of containerisation shaping globalization is in the emergence of transshipment hubs. The reconfiguration of networks has produced a new class of container ports. In order to link the separate services into a global network certain ports have been established as central links. These 'pivot' or transshipment ports have emerged over the last decade at critical points at greenfield sites. In the Mediterranean several such ports have been established, such as Algeciras, Gioia Tauro and Taranto that are among the biggest ports in the basin (Zophil & Prijon 2000). Similar hubs have been developed in the Caribbean: Kingston, Rio Haina, and Freeport. It is significant that these new traffic centres are larger and/or growing faster than the traditional port complexes in these areas.

Conclusion

It is evident that globalization has had a considerable impact on the container shipping industry. In the span of less than a decade it has been transformed from one made up of a large number of carriers, to one characterised by a growing concentration of capacity. Its services have been reconfigured and extended into all the market areas of the world, and service frequencies have been enhanced. There has been a growth in the numbers of vessels in fleet and there has been a major increase in ship size. Port selection has undergone a transformation, and the organisation of the terminal handling operations too have been internationalised.



These changes seem to conform with expected outcomes of globalization. There has been a stretching and an intensification of linkages. Ship services and port operations have become more alike. There is a growing degree of homogeneity in the industry.

Despite this strong evidence for the impact of globalization on container shipping, the paper has provided two caveats. First, it is clear that there are significant local and regional distinctions. Many of these still have to be documented and explained more fully, but it is clear that there are limits to globalization. In this respect container shipping is mirroring the trends already well documented in other fields. It suggests that caution should be employed in considering the importance of global forces. Even in an industry as global in scope as container shipping, local factors persist and exert a continued influence.

The second caveat is that the relationships between globalization and container shipping are not entirely uni-directional. Container shipping is helping shape emerging spatial patterns and relationships. It is certainly a facilitator of globalization, providing the means by which international trade can flow around the world with greater ease and lower costs. It is worth examining, therefore, how the shipping lines are giving rise to new market opportunities and helping shape the configuration of the global economy.

References

Beauregard R.A. (1995) The arising the global-local connection, in *World Cities in a World System*, eds. Knox P.L. & Taylor P.J., Cambridge, Cambridge University Press.

Brooks M.R. (2000) *Sea Change in Liner Shipping*, Pergamon, Oxford.

Cullinane K.P.B. & Khanna M. (2000) "Economies of Scale in Container Shipping: optimal size and geographical implications", *Journal of Transport Geography*, 8: 181-196.

Dicken P. (2002) *Global Shift*, London, Guildford.

Dunn J. (ed.) (1995) *Contemporary crisis and the Nation State*, Oxford, Blackwell.

Dunning J.H. (ed.) (2000) *Regions, Global and Knowledge-based Economies*, Oxford, Oxford University Press.

Evangelista P., Heaver T. & Morvillo A. (2001) 'Liner shipping strategies for supply chain management' paper presented at the World Conference on Transportation Research, Seoul, July 2001.

Friedman T.L. (1995) *Cultural Identity and Global Process*. London, Sage.

Gertler M. (1997) Spatial Limits to Production Capital, in *Spaces of Globalization*, ed. Cox K., New York, Guildford.

Gilman S. (1999) "The Size Economies and Network Efficiency of Large Containerships". *International Journal of Maritime Economics*, 1: 39-59.

Gupta S.D. & Chaudhry N.K. (1997), *Globalization, Growth and Sustainability*. Dordrecht, Kluwer.

Hannerz U. (1996), *Transnational Connections: culture, people, places*. London, Routledge.

Irwin D. A. (1996), "The United States in a New Global Economy? A century's perspective" *The American Economic Review, Papers and Proceedings*, 86:41-46.

Jussila H., Majoral R. & Delrado-Cravidao F. (eds.) (2001), *Globalization and Marginality in Geographical Space*. Aldershot, Sage.

Mccalla R.J., Slack B. & Comtois C. (2001) "Localism and Contemporary Containerization", Paper presented at the Annual Meeting of the Canadian Association of Geographers, Montreal.

Mcgraw A.G. & Lewis, P.G. (1995) *Global Politics: globalization and the nation state*. Cambridge, The Polity Press.

Midoro R. and Pitto A. (2000) "A critical evaluation of strategic alliances in liner shipping", *Maritime Policy and Management*, 27: 31-40.

Notteboom T. & Winkelmanns W. (2001) Structural Changes in logistics: how will port authorities face the challenge? *Maritime Policy and Management*, 28: 71-89.

Robinson R. (1998) "Asian hub/feeder nets: the dynamics of restructuring", *Maritime Policy and Management*, 25: 21-40.

Scholte J.A. (2000) *Globalization a Critical Introduction*, New York, St. Martins Press.

Scott A. (ed.) (1997), *The Limits of Globalization*, London, Routledge.

Slack B, Mccalla R.J. & Comtois C. (2002) Strategic alliances in the container shipping industry: a global perspective. *Maritime Policy and Management*, 29: 65-76.

Streeten P. (2001) *Globalization, threat or opportunity?* Copenhagen, Copenhagen Business School.

Wang J. & Slack B. (2000) "The evolution of a regional container port system: the Pearl River Delta". *Journal of Transport Geography*, 8: 263-276.

Youssef S., Evenett S. & Wu W. (eds). (2001) "Facets of Globalization: International and Local Dimensions of Development. *Discussion Paper*, 415, New York, The World Bank

Zophil J. & Prijon M. (1999) "The MED rule: the interdependence of container throughput and transshipment volumes in Mediterranean Ports", *Maritime Policy and Management*, 26: 175-193.

