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How to boost market introduction of foldable containers? The unexpected role of container lease industry

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Abstract

Transport of empty containers, which arises from the need to reposition containers, is an expensive business. This holds in particular for shipping lines, who are usually responsible for container repositioning and have to bear these container management costs. Shipping lines are known to follow various strategies to reduce these costs of empty transport as much as they can. A rather unfamiliar, but interesting option to save costs is the possibility to fold empty containers. This could save transport costs, but also transhipment and storage costs. Using foldable containers could therefore be commercially attractive, provided that foldable containers can fulfil the technical and logistical conditions demanded by the users. Despite their potential benefits however, there seems to be a reluctance to use these containers.

In this paper we analyse this reluctance and we discuss the important role container lessors could play in initiating the use of foldable containers. The special relationship between shipping lines and container lessors appears to be of particular importance and is a key to pave the way for using foldable containers.

Keywords: Container fleet management; Container design; Container lease industry.

1. Introduction

The arrival of the maritime container in the middle of the 1960s led to a great improvement of freight transport in many respects. The transfer of goods became much easier and safer and the use of containers paved the way for intermodal transport development. At present, the maritime container dominates the shipping industry and the extent of its influence in land transport is also abundantly clear.

An important downside of containerization however is that the place where containers are loaded and unloaded is often not the same, so transport movements of empty containers are unavoidable. These unproductive journeys are not too serious as long as repositioning of empty containers can take place over short distances. However, it becomes a real matter of concern if they result from cyclical or structural imbalances in trade patterns in the world economy, leading to long distance movements.

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On a global level the imbalances in container trades are a familiar and persistent problem. Large amounts of empty containers are being moved around the world. Drewry Shipping Consultants estimate the share of empty containers at sea as 21% of all containers transported. For land transport the estimates are even higher (about 40%). The total costs to the industry of this inefficiency were estimated about 10 billion dollars in 2003. These are the costs of interzonal positioning (i.e. movements including a significant sea voyage). Including intrazonal positioning (i.e. movements overland) would add another 5 billion dollars.

Of course container trade imbalances have always existed, but recent developments have brought the issue to the fore. The demand fallout caused by the Asian financial crisis in 1998 resulted in severe container imbalances on the major East/West trade routes and it took a long time before these imbalances more or less returned to normal. Now imbalances are rapidly increasing again, due to a robust growth of containerised trade within Asia and fuelled mainly by exports from China. Transport volumes coming from Asia largely exceed the volumes going to Asia, resulting in swiftly growing volumes of empty containers bound for Asia (see figure 1). Moreover, based on economic forecasts, it is likely that this pattern will last for quite a time. In view of a strong competition between shipping lines and the role of efficient container fleet management as a key factor in cutting their operating costs the issue of repositioning empty containers is therefore also gaining importance again.

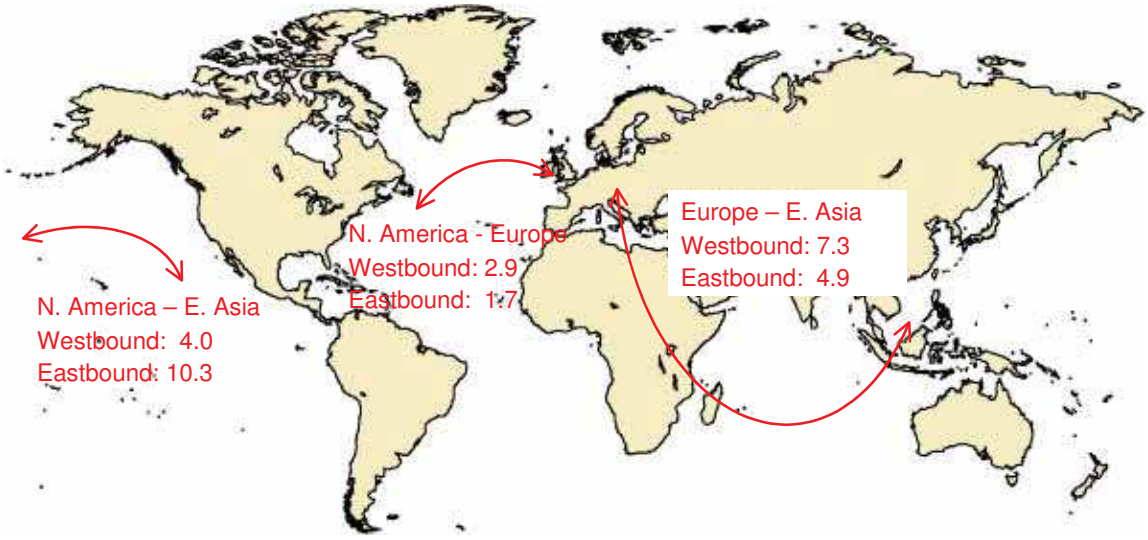

Fig. 1. Container transport volumes in major trade routes (million TEU), 2003

If we review the present strategies of shipping lines to control the costs of empty transport (see Konings and Thijs, 2001), it is interesting to notice that these strategies are mainly focussed on trying to avoid possible transport movements of empty containers, by improving the match of empty containers and cargo. Reliable and up-to-date information about the location of containers and cargo are crucial conditions and sophisticated information and communication systems have proved to be very useful for that. However, all these strategies do not influence the actual costs of empty containers. From this perspective the foldable container could be an interesting addition to the current strategies, particularly knowing that empty transport can never be eliminated completely, even with perfect information systems.

This idea of folding empty containers in order to reduce repositioning costs has been elaborated by Konings and Thijs (2001). The authors have analysed why previous initiatives for foldable containers failed and discussed the technological, economic and logistic requirements for successful commercial applications. In addition Konings (2004) further elaborated the economic aspects in a cost-benefit analysis in which different logistic concepts to use foldable containers have been investigated. The costs and benefits of using foldable containers in different transport chains have been calculated and compared with the situation in which conventional (standard) containers are used. These studies have shown that the use of foldable containers can lead to substantial net benefits in the total chain of container transport, but foldable containers have to cope with scepticism about their technical performance, the complexity of the folding and unfolding process in particular, as well as logistical and organisational problems with using these types of boxes.

However, considering the size of the net (chain) benefits it is striking that this idea of foldable containers is still not picked up. Many designs of foldable containers have been proposed in the past, but only a very few passed through a stage of patent granting, prototyping and testing. The Six-In-One foldable container (figure 2) is one of the rare examples of foldable containers that have been commercially used temporary, but it did not result in a wide application in the market. Here we pose that a major barrier for using foldable containers is risk avoiding behaviour of shipping lines, although shipping lines could gain most from it.

In this article we analyse this reluctant attitude of shipping lines and we discuss the important, but unexpected role container lessors could play, in initiating the use of foldable containers. To understand the potential advantages of foldable containers we start with a brief overview of the general costs and benefits of using these boxes. Next the role of ocean carriers and container lessors with regard to the empty transport issue is discussed and the relationship between these actors is further analysed. It is argued that their relationship offers an opportunity to achieve a breakthrough in the use of foldable containers.

2. Costs and benefits in the use of foldable containers

Evidently foldable containers will only be used if a certain net benefit can be gained. Starting with the costs it is clear that the use of foldable containers leads to some additional costs in the logistic chain. Containers must be folded and unfolded, which implies additional handling (manpower) and usually demands for ancillary equipment.

Another cost increasing factor is the exploitation costs of the container. In general the exploitation costs of a container are mainly determined by its fixed costs, i.e. the purchase price in combination with the depreciation term, and less by its variable costs, such as maintenance and repair, insurance, cleaning, and inspection. The manufacturing costs of a foldable container will be higher than for a standard box[1], because of a more complex construction, so also the exploitation costs will be higher. Moreover, higher maintenance and repair costs will also contribute to higher exploitation costs of a foldable container.

[1] The purchase price of a foldable box can be estimated at around US $ 6.000 (Konings and Thijs, 2001), which is about three times higher as the current price level (2004) of a 20ft standard box (Foxcroft, 2004b).

Possibly there is also a third cost increasing element. It is conceivable that additional transport movements are needed to places where folding and unfolding of containers is

Fig. 2. The folding process of the Six-in-One container
Source: SCC Six-In-One containers company S.A.

facilitated. The occurrence of these latter costs depend on the transport chains in which foldable containers are used. These additional costs should be compensated by cost savings (benefits) somewhere else in the logistic chain in order to make foldable containers an attractive alternative for using standard boxes. The opportunities for cost savings are found in the following activities in the logistic chain:

- *Storage*: if empty containers can be stored in folded state at a terminal or in a depot less space is needed and terminal or depot storage costs per unit can reduce;

- *Transhipment*: if folded empty containers can be bundled and handled together, the terminal transhipment costs per unit can reduce (economies of scale in transhipment);
- *Transport*: if folded empty containers can be bundled and transported together, less transport capacity is needed and transport costs per unit can reduce (economies of scale in transport).

In the study of Konings (2004) these costs have been quantified for different realistic chains, in which the costs of transporting a standard 20ft container and a foldable container have been compared. In summary, it was found that the exploitation costs of a container and the costs of container storage are insignificant, while inland costs generally have a high share in total chain costs. Based on data about a typical transport chain the conclusion could be drawn that the total cost savings in transport (at sea and over land) and transhipment can be substantial. Dependent on the number of links in the chain in which containers are used in folded state the calculated potential savings per container ranged from $ 420 to $ 650 per roundtrip .

The additional costs of using foldable containers should be deducted from these savings to get a net benefit. Since these costs predominantly consist of costs of (un)folding the container (the additional exploitation costs are negligible), substantial net benefits could be gained provided that these costs of (un)folding can be controlled.

3. The position of container carriers and lessors concerning empty transport

In maritime container transport, the shipping company fulfils a central role in the logistic chain. In its capacity as director of transport and container manager the maritime shipping company has a substantial interest in limiting the costs of empty transport. And in its role as transport organiser foldable containers can offer him potential savings in transhipment, storage and transport costs. However, there is a fundamental difference between the potential cost savings in sea and land transport: transport over sea almost always takes place under control of the shipping line. The extent to which folded containers save costs then depends on market circumstances (see Konings, 2004). Market circumstances also play a part in land transport, however, because shipping companies do not carry out this land transport themselves but buy it from providers, there is a direct benefit: the carrier can buy less transport capacity, because transport of empty folded containers saves space.

The container lease company takes up a rather exceptional position in the transport chain: the company's primary role is that of supplier of equipment. It is important for the lease companies to obtain the equipment where there is a demand for it. Attempts are made to bring this about by including agreements in the lease contracts specifying the location where a container has to be returned. However, to be able to respond to local demand for equipment, the lease company has to move containers as well. Therefore the lease companies themselves can also benefit from foldable containers: lower handling costs, lower storage costs for 'off hire' containers in the depot, and lower transport costs for repositioning.

Knowing that the shipping lines are responsible for container fleet management they can be considered as the most interested party for foldable containers of all actors involved in the container transport chain. However, as long as repositioning costs can be passed on to the shippers by imposing imbalance surcharges on the paying cargo or to the container lessors in case of lease containers that can be dropped in low-demand

areas, the incentive to capitalise the potential benefits of foldable containers may remain weak. The strategies of shipping lines to limit financial costs and risks in using container equipment can explain this conservative behaviour.

4. A closer look at the relationship between lessors and carriers

Leasing companies have always formed an important part of the container industry, providing spot availability of containers throughout the world. This role is confirmed by the balance of ownership of the world container fleet between shipping lines and leasing companies. During the last decade the share in fleet ownership by container lessors remained fairly stable around 46%, considering that in 1980 container lessors still controlled 54% of global TEU volume (Foxcroft, 2004a). Although there is much to say for owning against leasing containers, it is undoubted that the continuous success of the lessor industry can be attributed to the service they offer of flexibility and the lower daily costs in the short term (Stribley, 2000). Evidently it is beneficial for the shipping lines if they can pick up and drop off containers in response to varying demands of trade, equipment needs and cargo projections. This possibility is particularly relevant for imbalanced trades where load and containers are difficult to match in both directions. In these circumstances lease containers might give the shipping lines opportunities to avoid operating a surplus of containers.

The possible cost advantages of leasing instead of owning can only be explained by the typical financial conditions that characterise the shipping line industry. Stribley (2000) observes that, although the container industry has been very successful in terms of growth, this has not translated into a good profitability for the shipping lines. Containerisation is a capital intensive business and historically, many lines have lacked the balance sheet strength to purchase very many containers themselves. Daily cash flow on leases has historically been lower than bank loans or finance leases and for many lines the focus has been on dealing with the immediacy of cash flow pressures today rather than planning for long term profitability tomorrow. Although Stribley argues that this situation will improve, it will not immediately affect the benefits of leasing containers.

Of course leasing rates are of considerable importance for the trade off between leasing and purchasing, but as a rule the rate levels follow the trends in new build prices. The lease conditions (terms and dropping clauses) might therefore be of greater importance, considering that they are subject to negotiation. To avoid repositioning costs, ocean carriers can gain from careful negotiation of lease contracts, with a pick up in a deficit area, and a drop-off in a region expected to be in surplus when the lease term expires. Although some of these repositioning costs are borne by the leasing company, some of it will also be reflected in the terms of the contract. Depending on contract agreements, ocean carriers may choose to drop off containers at the cost of a penalty fee. Evidence exist that these drop-off charges usually do not reflect the expenses involved in repositioning the container. However, the costs for repositioning borne by the ocean carrier might differ significantly from the lessor, because the latter has to hire container slots from the carrier. Although carriers might try to shift the repositioning costs on to the lessors, it is obvious that such a policy can not be practised on large scale. Ocean carriers are still thrown on the services of lessors. In return, leasing companies are strongly dependent on the carriers being their main client. In this striking

relationship however, there seems to be an opening for the introduction of foldable containers into the maritime container transport market.

5. Creating a win-win situation

The reluctance of carriers to invest in foldable containers is understandable, considering the financial burden of purchasing containers. The purchase price of a foldable container can be three to four times the price of a standard box and a substantial number of boxes is required to reveal the system benefits of foldable containers. Apart from this the carrier has to cope with the exploitation risks, which are high because of the innovative character of the foldable container. These barriers could be removed by lease constructions in the way they are applied for standard boxes. Of course, the foldable container has also to fit in the logistic process of the carriers in order to provide a real added value to them (see Konings & Thijs, 2001). In addition to such logistic conditions, the technical and economic conditions are just as much of importance for their acceptance.

Lease constructions will shift the investment risks of foldable containers to the container lessors, but they are not willing to invest in these boxes if the market is sceptic and the sales volumes are highly unpredictable.

A way out of this stalemate for the introduction of foldable containers is via the container lessor industry. Container lessors should not only be willing to offer lease contracts, but should also become involved in operations with foldable containers. The lessor needs to take responsibility for the folding and unfolding of containers. That is to say, the leasing company should organise the assembly and dismounting processes. Containers need to be delivered erected to the shipping line user, so the customer should virtually notice no difference in using a standard box or a foldable container. Of course this assumes excellent technical qualities of the foldable container (see Konings & Thijs, 2001). Once the container has been used and is awaiting a repositioning trip it is handled at a depot, where folded units can be combined into one package, comparable to flat racks. By transporting empty containers in this way savings on repositioning costs will consist of both transport costs and terminal handling and storage costs. Given their strategic locations, existing container depots could be excellent bases to provide these folding and unfolding services. Such activities would be an extension of the current depot services, generating added value, in what is generally considered to be a marginal business sector (see also Wilt, 2004). Due to a worldwide network of leasing company offices these stations to fold and unfold could be in the direct span of control of the lessors.

This approach could bring mutual benefits to carriers and lessors. Shipping lines will gain more flexibility to drop-off containers to overcome cargo imbalance problems or any other causes of a fluctuating demand for equipment. The attractiveness for carriers to drop off containers is enhanced by the possible reduction of drop-off charges, because the lease company can save on repositioning costs. In return, the carriers should be willing to accept a higher lease rate for a foldable container, being the ‘price’ for gaining more flexibility. Although the daily lease rate of a foldable container is estimated as four times higher as the rate of a standard box, these additional costs are very modest compared to the costs of any – unproductive - movement of an empty container.

Container lessors have to bear the additional costs for the folding/unfolding and have to take into account smaller revenues from drop-offs, but substantial savings on the repositioning costs could very well compensate these opportunity costs. Being a neutral operator for different shipping lines means that there is considerable room for economies of scale.

6. Urge for action?

One can debate whether there are sufficient incentives for the container leasing industry to lead the way with foldable containers. It cannot be denied that the lessor industry has been experiencing poor market conditions during the last ten years, although the year 2004 has been a exception (Foxcroft, 2004a). The dramatic decline of new container prices in combination with low interest rates as well as the sharp decrease of utilisation rates, worsened by severe trade imbalances on the major trade routes, caused serious problems for the performance of the industry, both in terms of revenues and profitability. Perhaps it is more debatable whether this was a temporary phenomenon or whether something more fundamental is taking place. The trend towards consolidation in the container industry, the availability of more sophisticated and efficient financing techniques and better ways for shipping lines to manage container trade imbalances worldwide do suggest that ownership of containers by shipping lines will increase in the future at the cost of container leasing business (Stribley, 2000). Without suggesting that the leasing industry will disappear, this is a serious threat for this industry. One of the answers could be that lessors will broaden their services beyond the traditional leasing functions of supplying standard equipment and finance. Of course there are opportunities for greater industry cooperation, including container fleet management, to address the costs of container repositioning, but the foldable container could be an asset to enhance the services of the lessor beyond its present scope.

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