Sea Freight Council of NSW

Sydney's Intermodal Solution

Part 2 – Summary of Stakeholder Interviews and International Literature

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The Sea Freight Council of NSW Steering Committee for this project has representatives from:-

- NSW Ministry of Transport,
- NSW Dept of State & Regional Development Sydney Ports Corp
- NSW Road Transport Association,
- NSW Dept of Planning,
- Customs Brokers & Forwarders Council of Australia
- Logistics Association of Australia Ltd and,
- Private industry organizations.

The Consultants would also like to acknowledge the valuable contributions made formally and informally by the stakeholder interviewees and other industry representatives.

1. SUMMARY OF STAKEHOLDER INTERVIEWS

This is a summary of stakeholder interviews assembled from digital recordings and transcripts, as is intended to express the range and diversity of views expressed in the interview process. The authors are grateful for the candour, honesty and trust extended to them, and acknowledges the importance of getting to heart of meanings.

The transcripts will remain confidential.

a) **Expressed needs, wants and plans**

The need to develop sustainable intermodal strategies for the Sydney metropolitan area is universally seen as necessary and important, yet the form of the strategy and the identity of its protagonists are far from clear. Certainly, the FIAB report has gone some way in outlining a policy position for government, and a number of stakeholders expressed the need to see the detail or to understand the next steps.

> *"… there is a need to operationalise FIAB … there are a whole host of issues that need to be dealt with, not withstanding the normal cut and thrust of how businesses relate to one another within a supply chain …"*

FIAB had its supporters and detractors, and in some quarters, it has not achieved sufficient profile.

> *" … the [Government] has to be the developer … the driver of the transport strategy … they're the only ones in a position to do it … private sector's got too short term a planning horizon … Private sector through the normal consultative process can be a major part of that but government's got to come up with the strategies to say where its going to go … FIAB was the first attempt at articulating that strategy. FIAB is still yet to be operationalised and what this next phase that government's got to lead is the operationalisation of FIAB"*

There is an expressed frustration regarding the adequacy of the system and perceptions that little is being done. That is not to suggest that there is inactivity, rather four possible conditions exist;

(a) some industry players expressed ambivalence to the longer term requirements, seemingly as one senior industry representative stated:

> *"… most of them live in the moment now. But there are immediate issues now ……you don't have to look at 15 years to think about the congestion. A lot of people are thinking "what are my solutions today?" [and] "its not very hard before you identify a very clear tension between what government is trying to achieve and … apathy on the part of the industry towards what governments trying to achieve"*

(b) industry has not done enough to articulate its needs and expectations

> *"If industry doesn't have a great understanding of intermodal [systems] – the principles and concepts, then it's understandable that government won't and it's hard for government to put forward a strategy for which they have to hang their hat on, so as an industry I think we have a responsibility back to government to make sure that, we're really making if you like our thoughts and feelings on the matter clear to them"*

(c) industry is locked into a current mindset and embedded relationships which are difficult to change

> *"… there is loyalty with everything, people are generally comfortable with what they're used to and what they're doing, If they can see a commercial advantage or a real imperative to do something different, I don't know how strong that loyalty might be, ultimately they're in there to make a dollar but unless someone can go in and sell them an alternative that gives some real benefit they're unlikely to deviate away from it"*

(d) government has not sufficiently articulated it's intention

> *"… as the government develops policy there is a disconnect between the ideal around which the policy seems to be developed and what's really happening out there on the ground. The ideal is in fact that you've got the right level of scale to give you scale of economy and optimal unit cost …*

what are the real implications of competition policy, how much open access do we need? How much competition do we really need and that the behaviours that come from that cut across the initial ideal"

While many in industry have developed operational processes which deal with the current level of freight congestion in Sydney, the need for addressing future demand is recognised. Strategies focused on the development of terminals at Enfield and Moorebank have reasonable prominence in the minds of the interviewees.

"… in and around the port we've got enough capacity for the next 5 years [and] we know we've got the third terminal coming on board, imports continue to rise at say 5-7%; we also need Enfield to come on board, so that's a solution within the next 5 years … from 10 years onwards we really do need to have something further out inland; I agree with that. Now where the facility should be? We've talked about the Moorebank facilities and substantial areas there … and Wetherill Park sites … [but] how many inland intermodal facilities do we finish up having in the state of this size? My concerns are that we need to be able to get the road and rail infrastructure very effective before we even consider putting a facility inland. No good putting the facility inland then we wonder how we're going to get the freight to and from it. So the road and rail infrastructure I believe has got to be put in ... in advance and then you've got a facility following up. But you've got a road network and a rail network leading to it".

Similarly,

"… government now has got to work out in Sydney how is going to distribute freight into the best areas where you can minimise the truck movement and get the best efficiency out of it … Just because you've got land at Enfield or possible land at Moorebank … can we build an intermodal terminal? You've got to understand what they're about first before you go and place them. They're not like McDonalds or Kentucky Fried where you give consumers choice to eat at, this is large investment and you've got the think where to put it, and how does the government and private sector get the maximum benefit [in the area] there is Minto and Ingleburn … then you've got Moorebank and Enfield … all those are in one catchment area"

There is acknowledgement by the private sector regarding the analysis and deliberation to date, however the analysis itself must lead to specific plans for action. Considerable comment was made regarding possible progress after the NSW state election in March 2007.

"[NSW] is the state where study after study is done and I'm not critical of the SFC but this is another study in a long line of studies, and if you did a post investment review of the previous studies you'd have to say that it wasn't a real good use of money".

There is a counter view which must be fairly acknowledged and points to some industry behaviours advocating one position and delivering another. In all, the diversity of views, and/or ambivalence, and/or traditional behaviours perpetuates an industry psyche which is acknowledged and appears difficult to change. A range of views emerged on opportunism, innovation and the need for fundamental change.

"in NSW, the degree of industry fragmentation is higher and I think that drives at least some of the behaviour of individual carriers……..you have all this clamour to actually leave everything the same and add a lot of noise about all the shortcomings of the current system and some of those things are right, but absolutely not a clue of what they would do to change….they're the most vocal and they appear to be the ones most listened to and the ones who don't have solutions"

"I don't think they're going to find a model that will work for them. I don't think you can be nice to all the people all the time. If you want to drive efficiency, things have to change and I'm afraid you can't make an omelette without breaking an egg"

"… there are a few who have been a bit more innovative and gone down that path and may be a bit more ahead of the game and obviously doing it for a reason and obviously getting some benefit out of it"

The industry generally accepts the forward estimates for volume growth through Port Botany, and the stakeholders offered a range of perspectives on the likely impacts to urban congestion.

"Well I think it will cope because it has to, it will. It's a matter of what impact will it have on the rest of the city and what social costs will be imposed as a result of achieving the transport task outcome".

Growth in intermodal share over the last decade is seen as a partial relief on freight congestion, linked to the development of small to medium sized terminals in Sydney west. Several importer/exporter firms openly discussed the need to consider alternate pathways via Melbourne or Brisbane to alleviate their concerns on future delays and cost impacts.

> *"…I came back from that seminar a year or so ago and told the directors we really have to rethink about pushing our containers through Sydney in the not too far distant future. We're already suffering problems with the road and rail last year as well ... [Our rail operator] was not getting the slots they wanted, or that window was used up by other importers, [and now] we've got someone looking at a special project at the moment where we should build another warehouse … We're looking outside of Sydney"*

The market share for intermodal transport for Port Botany has achieved up to 25% over recent years, growing from a low base of 10% in the mid-1990's. A common view which emerged throughout the stakeholder interview process was that rail as a transport mode has undersold its capability; some limited views on how the rail system worked persisted.

> *"No I didn't know that, so there's basically four [terminals] in Sydney and Moorebank would be a fifth"*

> *" … there isn't a customer that is going to admit that they're not interested in timeliness or reliability. We all are, but on the other hand if you go to a customer and there is a rate negotiated and you achieve timeliness and reliability using rail, what's the issue? And not only that' I think rail is dramatically under sold. Most reasonable people you talk to will accept that there's a desire to make rail work and if for no other reason than to effectively move volume from the port"*

Not surprisingly, the industry divides into two groups:

(a) those "advocates" which have deliberately structured their transport arrangements around intermodal services have achieved substantial operational and service outcomes

> *"… what works for [company name] is the fact that he's one of those customers that has 30-50 containers come in per vessel so a rail head is imperative to him. He can't get a road operator that can pull that sort of quantity off the wharf in the time that he needs it*

> *"I keep my ear to the ground [that] … road transport is not getting any better … I've just been talking to our major transporter last night and he was saying you guys were so lucky that you made the decision to go to rail"*

(b) some potential users have used rail services intermittently or have attempted to engage rail and terminal services purely on "price", not adequately understanding rail economics, and the relationship between increasing volume and reducing unit cost.

> *" … I can see the benefit of rail absolutely if it was reliable and we had the visibility and it worked properly. Of course cost is big factor as well"*

> *"A customer of MIST swears by it [rail services]. A lot of the others are just still tearing their hair out and grappling with the road situation. To me there's been a lot of traditional relationships with customs brokers, freight forwarders and third party transport operators that don't seem to move away from their traditional ways of doing things"*

Whilst the current intermodal services move around 150,000 TEU's per annum in metro Sydney, the overwhelming view was the terminals, port interfaces and rail networks would not handle the 1 million TEU's forecast; this reinforced the views expressed in the FIAB report. Changing industrial demographics are evident with a polarization of demand occurring; the areas such as Rosebery and Mascot are being commercialized with mega retail centres and medium /and high density housing.

> *"The urban [industrial] sprawl has [moved] … out to the Arndell Park, Minto and Ingleburn so the freight task is going to be a lot more cross town so the logistical practicality of having intermodal terminals is going to play a big part in that".*

Insights were also provided which are drawn from observations and knowledge from overseas and reinforced the research outlined in the last chapter. In particular, strategies for the development of intermodal terminals in the UK are cited by some as highly relevant, requiring a joint public/private approach to the solution. One interviewee confirmed some international trends relating to intermodal strategies and links with property developments and planning frameworks.

> *"State Strategic Rail document and the freight village concept, what that's about is to achieve the modal shift that they were trying to achieve they produced an excellent document to that effect. Their projections were to achieve something like an 80% increase in volumes on rail, somewhere in the vicinity of [large] warehouses with access to track, that was the form of rail linked warehouses or operating through a terminal. So their view was that to get the modal shift you had to bring the client to the railhead, and to do that you had to have the warehouse facilities there, hence the freight village model. The second key element we came back with was if you're going to achieve modal shift, and this is what it's about, from road to rail then what you have to have above all else apart from that infrastructure is indeed competition. And that was highlighted when we went back again to the UK, and in over 12 months they are going to be achieving another four terminals … a 10% increase in volumes overall, so competition in the network is key in provision of the infrastructure in particular with the intermodal freight village concept".*

b) **It's about outcomes and value**

In essence the choice for using one mode over another is determined by assessments of reliability, price, ancillary cost and access to infrastructure; this latter aspect will be ignored for the moment. Firstly, reliability looms large in the minds of users, yet a clear trend did not emerge from the study.

> *"We certainly wouldn't survive as a transport company alone, the margins are just not there. We run transport ourselves as a service to the customer so that we can provide a point to point solution to what they're doing, and we can be in control throughout the process. We certainly don't make money on the transport side of things; it's more supported by the other services that we provide which include the freight forwarding and the customs clearance section … the reliability of the service is one of the most important features that anyone can really offer. We're not the cheapest in the market and we never will be, but as long as our service is at a reasonably high level and it meets our client's expectations then we will continue to maintain our customer base and build on that. But the moment that our service levels drop then we're back in the ocean with everyone else basically competing on price"*

Intermodal users advocate benefits such as volume movement, staging and high asset utilisation of road transport equipment, whereas road users advocate flexibility and responsiveness when service failures occur.

> *"I don't personally at the moment see [using rail]… I'm probably a bit of a 'doubting Thomas' with regard to the rail until I see it working. How can you plan for it properly and therefore rather than rely on what the government is or isn't going to do or what other players in the market are or are not going to do. We still see our role in road transport as remaining and increasing with volume"*

Conversely, the operational benefits for one rail user weigh in favour of intermodal over road, through substantial warehouse utilisation; the user is able to therefore "internalise" these benefits. Other discussions with some road-users did not suggest a "total chain cost" basis was being considered, or the benefits actually fell outside the user's company.

> *"It's a big advantage … I've got 2 trucks with 6 drop trailers and each truck can deliver in 6-8 containers a day. Now if I'm going down to the wharf I'd be lucky to get 2 containers a day out of them – that's 4 containers. I mean its cost efficient … I've got a team of people here that unpack containers and they don't have to wait for containers, I've got 4 container docks, 2 unpacking teams and the fork and container docks are full now if they were going backward 7 forwards to the wharf it wouldn't happen, wouldn't happen … as far as efficiency rail would get 9 out of 10"*

In discussion, some correlation was detected between the size of the user firm and the quality of transport service received, not surprisingly, given the bargaining power, large freight users will exert over suppliers, and the attractiveness of their contracts in the freight market. Smaller freight users tend to manage their service requirements through freight forwarders, who historically use road transport as a service differentiator.

> *He wants to control his service, the only way he can control his service is Model A [direct road services] … he can't run the risk of being locked into some other model because he's not master of his own destiny … the reality, so whilst I see the sense in this you've summed up before I think in what you said, that ultimately I don't have enough control in our business to really push for any of these other models as much as I can see the benefit and I think that overall the concept is right*

Whilst recognizing that transport prices are highly contingent on service quality, resources and other value-added services, some insights on price/cost relationships emerged in discussion.

> *Waterline says that an average container movement around Sydney is around $400, from port to destination direct to door with a dehire to somewhere. About $400 is the benchmark. We are using a combination rail road process [but] I'm getting to benchmark but I'm having it held and we bring it in as required … So that's our value add … and there's some side-loader activity or drop trailer and go. So I'm getting side lifter and a holding for 14 days as well.*

It is however important to recognise the relationship between service and price, and given rail services act as "price-takers", road-users want to see a substantial price discount to change their current buying and operating behaviours.

> *"We have to have a rail system that can deliver that box out to us out west somehow, not at $400 … it's got to be somewhere about $300 …"*

The economics of the intermodal does require further decomposition and analysis within the commercial benchmarks that are operating. The drivers of cost are quite different for each mode.

> *"Truck is getting paid for weight not space, a train operates on the basis of space and they are 2 different operating cost models"*

(a) Rail has high fixed costs and low variable costs, and a metropolitan rail movement (as a round trip) will generally cost $4,500[1]. If a train with 30 wagons is carrying 60 containers each way, the unit cost price charged per container is approximately $40 per 6 metre container (marginally high for 12m). As the rail system needs to return empty containers (on a one-to-one) basis, the weighted price for a loaded container will be around $80-100 per 6 metre container.

> *"Given the high fixed costs, operating port shuttles is not only about volume, but about "balanced volume"*

(b) Intermodal terminals are high investment cost items, particularly given the need for high performance pavements, tracking systems, heavy duty mechanical handling equipment, and perimeter security. Like rail, volume throughput becomes the most important driver of unit cost. A single container may be handled four times when transiting the terminal, and a weighted average cost is in the vicinity of $80 per container (for average three lifts).

> *"the terminal operator might be charging the client a marginal premium for occupancy of the site but it's their way to get a premium for the investment by sharing the reduction in the cost of the last mile – that is the essence of the freight village, that's how it works economically"*

(c) The final movement from terminal to the client's warehouse (referred to as the "last mile") will involve a road journey of 5-20 kilometres (one-way). Road transport costs in Sydney tend to average $80 per hour for a prime-mover and trailer involved in container haulage. The costs according to the time taken to perform various tasks, impacted by whether it involves waiting time to unload/load, queuing, or a drop-off and later return to collect the empty container. This is where "drop trailer" operations yield benefits for "volume" clients. The spatial relationship between port-terminal-destination will impact overall cost, and the price of competing services[2]. Road distribution costs from an inland terminal can range from $120 to $200 per TEU (i.e. 1.5 hours to 2.5 hours).

> *"… the relationship between the train journey and the truck journey is a very important one"*

Overall, whilst the benchmark for road services (for a movement from Port Botany to customer, and empty return) is around $450-500 per container, a comparable rail service will range between $300 and $400 per container. These indicative costs will vary according to service levels, container size and weights, and the

[1] Several industry sources, supported by rail cost modelling have confirmed this quantum; it assumes a reasonable utilisation, power-to-weight ratio and minimal delays for port turnaround.

[2] This aspect was dealt with in detail in the NSW SFC Regional Terminal Study, and whilst the quantum will change for a metropolitan operation, the overall principles remain consistent (Sd+D, 2004b)

location of the empty container return. Both examples avoid any allowance for detention or empty container park services[3].

One substantial importer acknowledged that recent assessments of supply chain cost were starting to recognise carbon emission costs and other social costs within a "triple bottom line" approach however this is generally the exception rather than the rule. Moreover, future costs such as road congestion and labour shortages were not identified.

> *"… the other thing that might drive our decision making in the future is some internal work going on here about climate change and carbon emissions and all that sort of thing and we're all going to get certain targets in that regard & they may have to reconsider that and take a higher cost option to meet those other targets …"*

c) Terminals, markets and catchments

The interview process yielded a number of key insights regarding market description, catchments, networks and operational processes for an intermodal terminal.

An intermodal terminal which seeks to handle upwards of 300,000 TEU's per annum will need to present a compelling case to a large number of freight generators and attractors, as very few importers/exporters individually generate more than 10,000 TEU's per annum.

> *"Within the Sydney market a large importer is … from about 3,000 TEU's upwards … and the retailers are huge, at 30,000 boxes … an electrical company would bring in 4,000 or 5,000 forty-footers … so they're the big class category as well"*

> *"It's one thing to develop a large inland terminal [such as] … a Moorebank or an Eastern Creek but you really then have to get the right mix of tenants, you need some to be importers and some exporters. You need ideally large players so that you're getting the sorts of stock turns within the warehouse and once you get the stock turns within the warehouse you're pulling through or pushing out the container volumes you need to give you the base scale in order to be able to service the community of importers and exporters that might be located within a surrounding 10-15km radius"*

Volume throughput is critical for optimising the terminal and rail cost economics in such a way that the assembled intermodal cost are demonstrably lower than the prevailing road services, which are competing within proximity to the proposed terminal. The internal distance relationships are important also; the road journey from the terminal needs to be relatively shorter than the rail journey, otherwise any unit cost benefits from the rail journey will not offset the terminal or distribution costs.

> *"As shocking as it was to our customer they realised even they couldn't justify with their volumes a sustainable rail service on a daily basis. When you then apply their volumes to the terminal facility and aggregate that with your other clients in the area and a terminal operating within a metropolitan area has a catchment area of somewhere like 10-15kms, so when you aggregate that up with the catchment area and on site clients you've then got half a chance of developing enough volume for a sustainable daily rail service"*

The (FIAB) proposed terminals at Moorebank and Eastern Creek, plus the expected enhancements at Minto and/or Ingleburn need to consider handling more than international containers in order to achieve scale economies.. Moreover, a holistic assessment of key national supply chains demonstrates considerable service and cost benefits are achieved by integrating the inbound international container and the distribution of domestic orders through the same intermodal terminal; this strategy is central to the economics of Somerton and Minto.

> *"Your question is specific about servicing the Port Botany work; we've always had a much broader view than that. Really from an intermodal perspective we tend to look at it in 2 aspects - international freight and domestic freight. In that consideration the drivers are that even though the cost of development of an intermodal facility for a road and rail intermodal terminal are considerable the more the revenue streams that you can have the better; so you always have the view that an intermodal facility would service both the international market and indeed the domestic market. At a high level we see that the FIAB report clearly identified a number of sites, one of which was*

[3] A simplified comparison of the various transport methods is provided in Section 0 on page 22.

Moorebank, we've always had the view that Moorebank is in fact complementary to [our development]"

This also raises the need to consider an individual terminal within a network of terminals, where competitive tensions (rightly or wrongly) emerge between terminals rather than the network of terminals acting to bring about a transfer of volume from road to rail. Prior analysis has indicated that the formation of intermodal terminals at Minto, Ingleburn, Moorebank and Enfield may lead to excessive capacity relative to long term demand within their cumulative catchments; several mitigating perspectives exist

(a) The M7 orbital does provide an important link between the Minchinbury and Wetherill Park areas and the Moorebank terminal, and therefore opens up additional demand … subject to the right internal economics

(b) The reduced form for Enfield allows it to focus on the inner western areas, and perhaps has a secondary role of providing supplementary staging and storage capacity for Port Botany

(c) If completed, future rail links between Minto/Ingleburn and Port Kembla will open up additional demand and provide an alternate pathway "around" Sydney

"You've got to carve up Sydney's area … into industrial areas to get the best benefit of an intermodal terminal through the private sector and the public sector … so government's got to figure out how to distribute freight in the most economical way and looking at the way it interacts with the cars, the commuters, the train track, the major highway systems, a whole lot of different things there so you can actually disperse your product in the most efficient way and by looking at the south west … what we're doing at the moment we're creating what we're trying to get away from … we're creating bottle necks, we're actually going to a bottle neck situation"

"When you look at Moorebank [at] 500,000 … If you want to get that size, the terminal can't sustain that sort of volume so you'll start … to compete with other models and what you're actually doing is reversing what you tried to create in the first place, you're actually starting to drag freight far past the traditional 15 kilometre radius … to 25, 35, 45 [kms] … from all round Sydney and you'll have a negative effect on what you're trying to achieve"

A strong message from many of the interviewees espoused the fact that progress over the last decade was achieved through the entrepreneurial efforts of transport operators in isolated pockets of demand, by accessing "brownfield" infrastructure and assembling operations to handle up to 30,000 TEU's. It could be argued that this progress occurred with only a passive response from government. This "start-up" phase for urban intermodal operations does automatically extrapolate to meet a demand of one million TEU's without affirmative action by government, property developers and investors.

"There is not the concept of just a free market in a rail environment; it doesn't exist to the same as it exists with trucking".

Alternate intermodal supply chains will only become a reality when the provision of capacity stimulates demand. A single importer/exporter or transport operator does not have the sufficient scale or impact to bring about change consistent with the Government policies which are designed to meet community expectations. Operationalising FIAB (or its equivalent) remains a priority within the Sydney urban freight task

From an efficiency perspective, the supply chain serving international containers needs to be seen as a contiguous extension to the port itself. It was not suggested that this model automatically deems port corporations or stevedores as "chain leaders"; rather as previously stated, the intermodal terminal is not an "end in itself" and exists within a supply chain of related logistics activities.

"One of the things we came back with on this last trip [overseas] was there's a role for government there and there's a role for ports. I mean the port could control the intermodal facilities as easily as they can control the port and whether they go to the market to contract another operator and again I think that Moorebank has got a huge opportunity to be one of the leading examples"

Considerable attention continues to be directed towards the performance of the port-land transport interface, as perceived by the users. A counterview must also acknowledge that there are two sides to this debate; that is, the opportunity for improving performance of the port interface does not solely rest with the stevedore, and debate about 24/7 operations to spread demand is highly pertinent … the stevedore have afforded this opportunity, however in the main, transport operators and freight interests seem reluctant to access non-daylight capacity. Intermodal transport can start to provide solutions which offer the benefits of 24/7 operations.

For intermodal transport via an inland terminal, the performance of the port-rail interface and rail networks are relevant. The Southern Sydney Freight Line is expected to be operational by year 2010, which provides a quantum improvement for intermodal services to the south-west of Sydney.

> *"The reliability of the rail system is adequate whilst it's not challenged … It depends very much on port relations maintained by the rail operator, it depends very much on the waterfront's ability to manage its daily operations both road and rail"*

Whilst the port-rail interface is arguably handling the current demand (nominally around 200,000 TEU's per year), considerable attention needs to be given to handling future volumes which is expected to handle one million TEU's within fifteen years. How this is to be achieved remains elusive to many stakeholders.

> *"… it puts a lot of freight on the same stretch and makes the time paths very tight and not a lot of room for error, and there's not a lot of tolerance at the ports for how we compete for the time paths to get through"*

> *"… you would need to develop a loop into both ports, the current window availability is just not enough windows down there to be able to grow the freight task much beyond where it is now"*

A view of one major player places the enormity of the task into perspective, and challenges some of the current mindsets that persist.

> *"… we might note that rail capacity on a given infrastructure is finite and if you start converting container volumes into numbers of trains and then number of trains per hour around the clock and days a week, its a frightening number and I don't know that anyone's given it a lot of thought … what can they do because there's finite capacity there and the idea of having a train coming in empty and going out full is not a great one and any terminal operator would probably say if there's a finite capacity … the capacity [needs to be] utilised and then that comes back to the whole issue of who could put together the volumes in that sort of a way to make it work efficiently and if we're trying to be nice to everybody and we say oh well Harry's a good guy and Fred's a good guy and they all want boxes at 9.00am so I'd better divvy it up evenly, you're probably not going to get very efficient utilisation of the assets"*

Consequently, that perspective then exposes a key question, as …

> *"Another interesting thing too with intermodal, is, who's going to drive the movement, is it going to be on a trucking company or a freight forwarder on a consignment by consignment line or is it going to be a shipping line saying this ship is going out west. Now depending how that unfolds as well, if they're trying to talk about whole ship movements and I don't know if this is on the radar at all but that has very big implications with customs and quarantine as well because they'll want to do their risk assessment they might want to take some off the stack for rail to move them through the container x-ray process … If we're going to migrate to a different structure who is best placed to do that? Its easy to talk about chain integration but when all the options under the various incoterms [terms of trade] … cut across how the chain might operate in the physical sense and depending on who controls the goods at what point in the chain and what their terms of trade are will determine what [modal[transport decisions they make"*

> *"… (Government) also has to accept that it needs to talk to the large operators. I think there's a political aversion to talking to large operators and a political attraction in talking to the little guys who have so much so say, so many problems and no solutions. They [government] probably need to spend a bit of time talking to the people that might be able to offer solutions"*

The business model and the site access arrangements are also influenced by the role of the terminal and the structure host chain. The stakeholder engagement process discussed the various chain models (as presented in Part 1 Report). Roles for the terminal could include road-rail transfers, container staging, empty container management and repairs, pack/unpack services, Customs and Quarantine services, and

the establishment of a freight village with warehousing and support amenities (chain model option "F"). The need to integrate value-adding services was seen as a "must do"; supplementary activities such as domestic rail movements would improve operating cost economics, whilst activities focused on air-freight would seem a distraction.

> *"[Customers] use this terminal in a number of different ways depending on what their actual transport logistics are at the time. Sometimes they'll use us a terminal transfer operation they run their own trucks between here and their factory to pick their containers up and bring the empties back to us to either re-use or send back in to the container parks. At a seasonal time of year like this it's not uncommon for them to allow us to unpack a number of containers for them and we'll offer them some interim warehousing and re-delivery if required. Customers like that that can pick the eyes out of the services that we can offer we can fumigate and tailgate everything as well too so customers like XXXX are certainly going to be our growth area".*

A universal position was the need to integrate the management of an empty container park as a contiguous function within the terminal, and was seen as the only means by which rail can compete with road on price and service.

> *"I certainly support the logic behind the intermodal terminal having a container park facility. More so for the fact of being able to reuse and release those containers back into the marketplace"*

> *"Empty containers … [and] rail, the job's not finished until we dehire the empties so how is that catered for … if I go back to the example where we trialled the rail going out, fine, but there was no avenue ongoing to return the empty without incurring additional costs, if at all. The one advantage that we did have, the rail company at the time, they do focus on export and they did say if you have any high cube containers for this particular shipping line don't worry about de-hiring, bring them here and we will on-hire, off-hire for you"*

The most efficient management of empty container involves a concept called "triangulation", which reduces the cross-metropolitan movement of empty container to/from Port Botany. Historically, shipping lines required the return of empties to Port Botany to expedite the evacuation of empty container to a ship at their minimal cost.

> *"[As a shipping line] … to be able to triangulate [import and export movements] successfully, we've got to find a line of import cargo where the resultant empty is compatible with an export line so that we don't need the box to transit at depot and then that can be put into its location"*

However, there are changing patterns emerging in the management of empty container; the implication that arises is that the footprint for inland terminals must be sufficiently large to hold an inventory of empty containers, and when achieved, portside land which is strategically important and costly at Port Botany maybe turned over to other functions; the holding of empty container at port maybe convenient for shipping lines where they internalise the benefit, however contributes to excessive cross metropolitan movements.

> "… so if I rationalise all of that, it still comes back to intermodal terminals being by and large a property strategy that allows you to change the physical shape of the supply chain by changing some of the commercial relationships and the way that the way the value chain works sitting on top of the physical chain"

> *"We'll use only the shipping lines that have a [western Sydney] depot … because if I've got to run a truck down to the port to return a container it's just inefficient for us"*

> *"I've got a strong view on that … all new intermodal developments should incorporate an empty container facility, unquestionably, and all this argument about being close to the port and all that , its traditional and I think it really is an argument that is slowly losing ground"*

One strategy for accessing demand for the terminal is to create clusters for industrial development around the intermodal terminal, establishing a freight village. Such a strategy reduces aggregated chain costs by removing the cost of the "last mile" for the site occupants. For firms not located directly in the freight village, operating costs may also be reduced through access to the scale of the operation. Within Australia, the Somerton, Minto and Yennora terminals may be considered as freight villages in function, albeit that size, volume and operating maturity has not been achieved in all cases.

> *"I think you've probably touched on a couple of key points … Intermodal [systems] do two key things … they will change industry patterns, they will suck in industry around the development given that the land value issue particularly in Sydney is very expensive at the moment … so what's happening is you've got to move [the logistics] industry now to more affordable land …"*

> *"it's an interesting thought about bringing the customers in … obviously you would have some sort of restriction on the size of the property and the village so to speak and therefore how many are coming in. And it will work no doubt for the larger players which are probably what you're aiming at. For the smaller guys I suppose the advantage is that you're taking that volume away from the [port] terminals that they're currently going to access [by road] and … in theory would make it a bit easier on the smaller guys who would traditionally go through the normal method of picking up their containers"*

d) **Open access, power and business models**

In most instances, discussion with stakeholders identified the need to consider the business model which manages the terminal itself, and the rules for open, limited, or closed access …

> *"The models talk about the physical things that happen on a site … but really open access is like a philosophy and if you've got a terminal that sits in [Options] D, E or F … and [for] F dictate that they have to be a certain size, its really up to the people who own and control it to say they've got a want and a desire and that's all it takes. Any terminal can be open access but really it's the philosophy of the people that run the terminal it's as simple as that …"*

However consensus on what constitutes ""open access" was not achieved … somewhat expectedly given the divergent views based on experience, operating philosophy, or the need for control over the supply chain. For several existing intermodal operators, an operating philosophy in favour of open access works offers opportunities for business growth …

> *"Open access terminal as far as we're concerned is any train, anyone's freight, but obviously the freight will then determine which train set comes in here … [and] any truck can come into the terminal to pickup their freight"*

Similarly …

> *"We're certainly not closed minded to exploring any options. As I said we have considered opening our access to a certain degree. For any rail operator to come in here and provide us with the service the more that I can allow them to conduct a profitable business for them selves the better flow back to us is going to be, so by allowing them to bring in their own freight and load to their own services I nominate at a dedicated time path/ time pattern I think is beneficial to both parties providing we can see the flow on effect into the service that they are providing us a dedicated service"*

Other stakeholder presented a different perspective based on their international research and a frank assessment of some commercial realities …

> *"I'm not entirely sure, it was one of the things that I wanted to ask you because I'm not too sure that there's too many of them anywhere and therefore everyone's probably got their own idea. To me it suggests that it's run by a bureaucracy, one of the government departments and they try to be all things to all people and to be fair and to be nice, and do great things … I think there's probably a good reason for it [not many open access terminals]… they don't work …"*

And a view of an importer reflects some fundamental concerns on the complexity of "open access" models…

> *"I probably don't care, as long as a customer, I'm getting an efficient service … and proper turnaround [at] a competitive cost … I can see your point of view, probably a nightmare to run because the first thing [is] someone else will want to take it over and it becomes a money making thing and so how do you run it … do you let the government run it? But the government is never known to be the most efficient operators are they?"*

Broader strategic considerations were identified as factored into modal choice decisions, and which impact the overall viability of an intermodal terminal, and the access arrangements and business model employed. These relate to:

(a) Vertical integration risks and benefits, as …

"… we get to the very essence of power and control over the supply chain and arguments about vertical integration, because vertical integration is not really about (and this is my opinion) efficiency, it's about control" … [and]

"… you are asking about a major commitment and that's the way you're going to do business for the majority of the time … a big question mark for us how is the pricing regulated and how are we going to be confident that someone is not going to in two years time see that we are now locked into this situation and we are at the mercy of having to pay higher rates which increase at a rate disproportional to non users of that service and therefore we lose our competitive advantage"

(b) Scale and ability to compete, as …

The smaller carriers will always be the smaller carriers. A smaller carrier will only be able to grow if it's got a staging facility … Now you'll have this scenario in this freight village [where] it can move the boxes off and double handle it….you'll have this scenario in this freight village you'll probably get] 20 or say 30 operators will probably take care of about 25-30% of the transport industry. You'll still have the argument that we have these days they've got an unfair advantage

The risk of contractual lock-in and inequitable value distribution, as …

"… it then turns on the level of lock-in to a situation or the degree of flexibility. It then turns on the management vehicle which brings about the efficiency outcomes and are they real, and are they delivered? … From the efficiency outcomes are there cost benefits, is there value freed up and finally how is that value distributed in order that those playing the game inside the group derive a competitive advantage with all due regard to trade practices"

(c) Business models and regulatory arrangements which influence whether the firm is motivated to engage with an intermodal solution

"Now each of those terminal operations perhaps requires different terminal management and governance models sitting on the top of it and that's where we get to the essence of what is an open access terminal if you're a rail operator and you don't have a terminal and you want access to the terminal then you're going to advocate an open access terminal. If you're the incumbent rail operator and the bundling of the rail and the terminal and trucks gives you a competitive advantage so you will internalize the benefit you're going to want to close the market, you don't want an open access terminal so it goes to the very heart of what is your competitive advantage."

e) What then is the role of government?

All interviewees considered there is a role for government to provide leadership in the development of large intermodal terminals consistent with their own transport policies, whether such policies are doctrine or aspiration. Comparisons with other states' activities were made, as well as the relevance within the AusLink framework. Typical of the views was …

"… to get a western Sydney intermodal terminal, especially if we're talking open access, we probably need government to start the process to make something start to happen … and then that will attract business and it will grow. I don't think you will see an individual operator with enough incentive to go out and set up a terminal out there especially on the scale that we're talking"

The scope and extent of government involvement ranged from a soft handed approach to greater intervention towards achieving an outcome.

"I think that government needs to set the model that they truly believe is going to be successful for the freight task based on import from existing amenities like ourselves. I certainly do support the use of a common user terminal but I don't think that government can be dictatorial as to how that model is operated,

"… there is one point of view that says that government's not interested in whether freight is efficient or not, that's up to the market to determine. They're only interested in passengers …

"I think that's exactly it because most people would look at this and say that makes sense … [that] market forces will get us there … but I think market forces will get us to the grid lock and then government will be stepping in …"

In some instances a specific role for government and a number of comparisons were cited, establishing the boundaries within which the private sector players can invest, but recognising that start-up capital and initial support will be critical.

"... so governments role might be land banking, planning what have you but it also has to be reasonably careful about the sorts of players that it invites into the freight village as it were … the business rules or conditions that they require people to meet. I think there's a great opportunity there to influence behaviour or even control behaviour, and of course they've got the land rental at their disposal to assist in that process"

"I think it's a strategic area, any terminal whether airport, sea port and an inland port should probably be no different. The government needs to have some control and say over it, particularly security wise. So the government has to be heavily involved, the realities are we can all talk about putting an inland terminal somewhere, but unless the government backs it and is the driving force behind it, there's no-one here that's going to finance that or do it themselves other than someone like a [major transport player] and that's not what we want"

"… the government owns the land, it doesn't want to build and own buildings but it might say here's 150 hectares, here are some rules by which people will be able to build on the land, we want to franchise the internal circulation of containers, as a competitive tender every 5 years … when you look at it, its like stevedoring I suppose, Inland terminals … where you've got quite a lot of CapEx …"

At the last EC Urban Logistics Summit in Paris, (the BESTUFS Conference, 2002, see www.bestufs.net) Japan reported on the breathtaking success of the implementation of the PLT [Public Logistics Terminal] concept at Seki, near Nagoya. In fact one major difficulty is now how to distribute the profits the centre has made, back amongst the users. In fact the independent and non-aligned nature of the terminal ownership has been an attractor to use from small and medium companies using transport and other logistic services. This may mean a consortium of independent owners or even a governmental operator may be one of the key elements of the success of a PLT.

Paper titled "The Public Logistics Terminal" by Associate Professor Kim Hassall, Centre for Freight and Logistics, Melbourne University (Hassall, 2005)

2. SYNOPSIS OF INTERNATIONAL LITERATURE

This section summarises an extensive search and review of the international literature in support of the project. An abstract is also provided in Part 1 Report. An important realisation made by the authors is that Australia does not lag behind international thinking on intermodal terminals, and that the issues being grappled with in Australia are common around the world.

a) What is an open access terminal?

An intermodal terminal is a critical element in the intermodal supply chain. It can act as a power resource and strategic asset to create competitive advantages for the owner. The owner can use it to exert market dominance over competitors and buyers, and extract monopoly rents. In this context, an important issue that emerges is the ownership and operation of the terminal. Since, only a limited number of terminals can be sustained in a market place (and catchment) and the terminals are a critical resource without which suppliers of intermodal services cannot function, an important question is …

> ***Who should own and operate the terminal in such a way as to ensure that the benefits of intermodal transport and competition are preserved and enhanced*.**

This question is common when an asset of strategic importance such as the intermodal terminal exhibits features of a '*quasi-public'* good or monopoly. While the question can be considered trivial, the answer is not; it has been the subject of a substantial debate for some time not only in Australia but also overseas including North America, and Europe.

Two approaches have been used in the OECD countries to promote fair and equal access to the terminal for all competitors: open access and vertical separation (Defilippi & Flor, 2005; Lu, 2002; Shea, 2001). In the US there are some vertically integrated terminal operators who have ownership and control rights over their own terminals and other fixed facilities, but who have to grant open and equal access to their competitors. While some parties believe that open access will encourage innovation, improve efficiencies and lower costs, others don't. Their argument is that because the regulated access regime allows all sorts of company-to-company contracts, the end result is that access will be selective, provided in the first instance to those who can sign better deals. They point to a number of litigation cases that have been sanctioned by the courts as *ex post* facto (Shea, 2001). Nevertheless, it makes sense to admit that vertical integration has the potential to reduce transaction costs (Lemoine, 2005; Sd+D, 2004a, 2005; Williamson, 1991; Williamson, 1996; Williamson & Masten, 1999) by integrating linehaul and terminal operations. Also, it can facilitate co-ordination in investment decisions to ensure that the priorities of terminal operators and linehaul operators are aligned.

Europe tends to favour vertical separation under which the terminal operator should not be an above-rail operator who is likely to be the user of the terminal. Accordingly, this approach gives competing service companies equal access rights to terminals at non-discriminating charges.

It should be noted, however, that vertical separation also has some shortcomings. First, the opportunity to exploit economies of scope and innovation in the planning of services and infrastructure becomes more difficult for rail operators. Second, more sophisticated pricing for access to capacity may become difficult if the terminal provider cannot obtain direct information about demand (Gonenc, Maher, & Nicoletti, 2000).

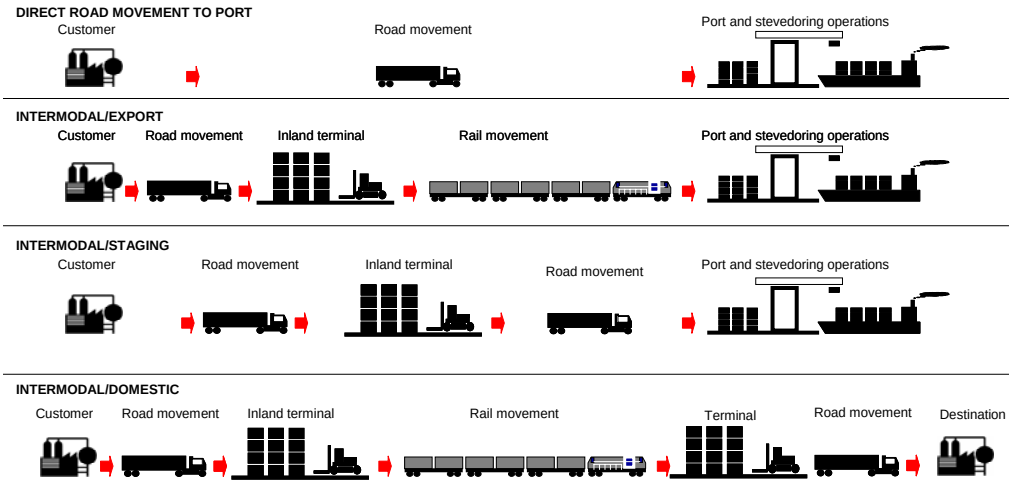
b) The relationship between terminal and system

A *logistics system* is a transport operation which has been designed so that the *different parts/elements* of the system link together as efficiently as possible. Since each commodity and industry has its own particular transport requirements, there is no single system which is ideal for every situation. Despite some progress, there is still no common definition of intermodal systems amongst the intermodal research community including practitioners (Bontekoning & Priemus, 2004). The popular frame for all definitions is the movement of goods in one and the same loading unit between two destinations utilising more than one mode of transport (UN/EEC, 2001). Clearly, in this frame the organisational aspects and interfirm

arrangements are either implied or omitted, and therefore consideration is not given to access or other commercial arrangements.

Woxenius (1997) offers a useful conceptualization of an intermodal system. He describes the system in terms of nodes and links and how transhipment nodes can be connected with rail and road links into intermodal transport networks. According to Woxenius (1997) transport systems are characterized by the repeated movement of goods between supply and demand points or nodes. Activities such as consolidation, sorting, storing, coordination, maintenance, empty depot-storage and transhipment between vehicles as well as between transport modes are performed at nodes. For each transport task, a node can be defined as a source, a destination, or simply a transhipment node with freight flows being always interrupted at nodes. Links representing transport and movement activities connect nodes making up a transport network. By connecting all sources and destination with a number of links through transhipment nodes, a physical transport network can be defined (Woxenius & Lumsden, 1996). Figure 1 (Sd+D, 2004b) shows a number of physical intermodal networks with the terminals representing transhipment points between end points in the supply chain.

Figure 1 - Road and Intermodal Freight Systems



Source: NSW SFC Regional Intermodal Terminals: Indicators for Sustainability (Sd+D, 2004b)

Woxenius (1997) conceptualises a *terminal* as a node, a physical place in the system. While his description is useful, it is limited and silent on the organisational dimensions of the system; viz, how firms relate to each other. Without ignoring the importance of other factors such as technical, regulatory and legislative, *the organisational issues are the key success factors of the system*. It is more appropriate to view an intermodal terminal as a functional element of the system (Bannister, Maggi, Nijkamp, & Vickerman, 1998; Sd+D, 2004b). Within this perspective it is easy to define the role of the terminal in the system and understand how the terminal should be managed in order to deliver competitive advantage to the users, operator and community.

> Ultimately, the performance of intermodal chains depends on the coordination of activities across the whole range of modes and business entities involved. Intermodal research has to a large extent focused on the technical issues of intermodality and transport optimisation, however the practitioners acknowledge that the transfer of information and responsibilities between chain players is a critical issue if the system is to function as efficiently as possible (Styhre, 2005)

There is recognition that intermodal systems are very important; they promote the use of the most appropriate mode of transport for different transport tasks, by combining the flexibility and door-to-door capabilities of road operations with the efficiency and capacity of the rail transport and the geographical reach of the sea transport (Meyrick&Associates & ARUP, 2006). As Styhre (2005) put it, the aim of intermodal systems is to build chains that facilitate a transport system that is competitive on the freight transport market by combining comparative advantages of different modes. Clearly, each mode has its own advantages such as flexibility, capacity, energy consumption and environmental impact. Intermodal systems allow each mode to take the share of

the transport task for which they are more efficient, and cost-effective (Notteboom & Rodrigue, 2004). In the intermodal transport chain, each mode retains its distinct identity and importance but the role of each is determined by the objectives of the system as a whole. This is not to say, however, that intermodal transport is competitive for all situations; its competitive advantage should be assessed on a case by case basis or for specific tasks and operating conditions.

An intermodal transport system must be thought of as a technical, legal, commercial and management framework for transporting goods in an unbroken ITU (Intermodal Transport Unit) by successive modes of transportation (Styhre, 2005). A terminal on the other hand is a managed element of the system which connects the system with other parts by performing transhipment tasks or serving as a source or sink for freight moving through the system (Woxenius, Sommar, Roso, Bärthel, & Lumsden, 2003).

c) Drivers and Economics of Intermodal Logistics

Demand for intermodal products is a derived demand; it is derived from the propensity to trade from a buy/sell transaction and the subsequent need to move products or freight between sellers and buyers, or between points A and B, or through networks of nodes and links in the most cost-effective way. Ultimately, it is the overall logistics cost of a service offered that determines which pathway or intermodal network the freight will use, particularly where there are a number of available alternatives and choices. The price paid acts as a proxy for the value of the service offered and also as the mechanism that optimises the allocation of scarce and expensive resources and limits the choices.

In North America and Europe the underlying demand for intermodal transport stems from at least two key considerations. First, intermodal transport is perceived as being able to provide a more cost-effective approach to address some of the capacity and service limits of individual networks, which have been built around individual modes. Second, there is a perception and often the reality that the 'business-as-usual' traffic growth scenario would increase the social cost of road transport through traffic congestion, accidents, air pollution, greenhouse gas emissions, land use, noise and subsidisation of transport infrastructure service (TransportCanada, 2004).

The business economic rationale for using intermodal road-rail transport is that the line haul costs are lower for rail than for road. It should be noted, however, that metropolitan intermodal logistics may not achieve this outcome as the short-haul nature of the rail leg can make it difficult to compete on price without optimal utilisation. Further, the full social cost of road transport is not generally internalised, which also helps make it cheaper than rail.

Intermodal logistics can reduce the unit cost by increasing the volume of cargo on the shipment leg and reducing cargo handling cost at the interfaces. This is achieved by integrating various stages in the system to exploit the economies of scale, network integrity and network density. Cargo handling is a major issue particularly at the interfaces including intermodal terminals. (Woxenius et al., 2003) argues that the terminal cost itself is a serious barrier in the European transport system and that the benefit of intermodal logistics can be appreciated only after paying the price of terminal handling in terms of lift fees and also a waste of time due to poor co-ordination and management. Technologies and management systems that are able to lower the terminal costs and delays will substantially contribute to the growth of intermodal transport. The British and European experience shows that there are economic benefits in businesses being located at Strategic Rail Freight Interchanges (RFI), by taking out the cost of the 'last mile'; the expense of the road link from the Strategic RFI to the warehouse or factory. Like the cost of empty backhauls and empty containers, the cost of the last mile is a complex issue which the industry has not been able to address, yet it is critical if the intermodal concept is to work (SRA, 2004).

In the UK a Strategic RFI is a facility which optimises the use of rail in the freight journey and minimises the secondary distribution leg by road[4]. In many freight movements, rail is unable to fully complete the

[4] DIRFT Limited owns and operates a 200 hectare development, previously known as the Daventry Intermodal Rail Freight Terminal and is often cited as a excellent example of the SRA RFI strategy. It is located 65 kilometres south-east of Birmingham. The key elements are the, distribution and manufacturing facilities which are capable of direct rail connection to the existing Daventry International Railport. This facility, which has been operational since 1997, in turn

journey; essentially, rail alone cannot match the door-to-door capabilities of the road. Therefore, it must work as part of an integrated journey alongside other modes, primarily road. The best use of rail is, then, in the long-haul element or the primary trunk journey, linking, as necessary, with other modes for the secondary leg of the journey. Within this context, strategically located interchanges are required to allow the best use of rail in national freight movements. Strategic RFIs are, therefore, the key feature of national rail infrastructure necessary to promote a shift from road to rail and to achieve the associated sustainability benefits.

Similar views are held by the freight industry in Australia. Rail freight growth is often seen as promoting environment benefits, reducing congestion and enhancing the national economy (Hesse, 2004; SRA, 2004; Wiegmans & Bruinsma, 1999; Woxenius et al., 2003). While most state governments have set a target modal shift around 30 to 40 per cent over the next decade, the developments are somewhat mixed and perhaps disappointing. Given the flow on efficiency benefits, the Federal government is also seen as having a role, including funding. Frustration is evident on both sides; industry's frustration is perceived to be a government leadership and government's frustration arises from a lack of industry vision. The real issue is the frustration of how to bring together all parties to work out a way forward.

In conclusion, the transport economics of businesses connected to rail at one or both ends of the freight movement are materially improved with a proper integration of all modes, better management of interfaces and efficient use of resources. This however will require the government and industry to work together not only in funding the infrastructure but also in setting strategic directions and goals.

d) Intermodal Terminal as an Element of the Supply Chain: Focusing Analysis

Whether or not an intermodal terminal is open access, it should be clear first and foremost that it is a place or spatial unit that handles trains, trucks and cargo; it is also an operating element that handles trains, trucks and cargo with *operational* efficiency; an economic unit that handles train, trucks and cargo with *economic* efficiency; and an administrative unit that handles train, trucks and cargo *within an efficient administrative and policy framework*.

This insight seems unremarkable except that it is cautionary against thinking that terminals are ends in themselves and are to be managed in such a way. A terminal exists only to the extent it serves markets or more appropriately, individual firms or groups of firms, whether they are production or service firms. A further necessary insight, and cautionary to our thinking, is that firms use terminals only to the extent that they derive value and competitive advantage from so doing; and firms will choose those terminals only to the extent that they deliver the value the firm seeks, however, the value is defined in their business model.

Viewing the terminal in this way makes it easy to understand that the terminal advantage is a 'derived' advantage; it is derived from the value-adding created for shippers and third party service providers involved in the end-to-end movement of cargo. In short, shippers and related service providers derive value or benefit from moving cargo through that terminal; and shippers would choose that terminal in an end-to-end logistics pathway. Intermodal terminals are only sustainable to the extent that they exist as elements in supply chains that provide low cost and/or high service transport paths to markets. As they compete with other terminals or road transport for market share; they must not only be efficient, but must also exist within an efficient chain where the total cost of the elements is lower than the cost of competing chains for a comparable level of service (Sd+D 2004).

A final observation is that an intermodal terminal that is well embedded in the supply chains becomes a critical asset or power resource and its relative importance and contribution to the overall chain performance may become a source of conflict and instability in the chain depending on who owns or controls it.

provides inter-modal access to the West Coast Main Line enabling speedy and efficient freight movement by rail to mainland Europe via the Channel Tunnel as well as to Scotland and the English deep sea ports. Users attracted to the Logistics Park already include Eddie Stobart Ltd, Tibbett & Britten plc, Tesco, Ingram Micro, WH Malcolm Ltd, Wincanton, Exel and, most recently, the Royal Mail Group (refer www.dirft.com)

e) **Physical and Organisational Interfaces**

The review indicates that in an intermodal system attention should be directed at two types of interface; physical and organisational. **The physical interfaces** should be able to provide connectivity in terms of appropriate facilities, compensate for the different characteristics of modes and bridge the gap between the modes with respect to frequency, capacity and time. The inability to do so will result in inefficiencies at the interfaces and the system as a whole (Woxenius, 1997; Woxenius et al., 2003). **Organisational interfaces** are closely related to efficiency in terms of the use of IT systems and information transfer, and the willingness to co-operate and develop the business with other organisations including the competitors.

Unfortunately, historically, both public and private sectors have focused on the physical interface for obvious reasons; physical interface is tangible. A change in thinking on intermodal supply chains does take some time to flow through to implementing new ways of operating. Moreover, the transport sector is less sophisticated than other industries, and less tangible issues will not readily gain traction.

Why is it that organisational interfaces more often than not erode more value in the chain than the physical interface? One explanation is that there is a poor understanding of the issues involved in the interfaces. Organisational interfaces represent points in the chain where the value is captured or lost. In each organisational interface, there are buyers and sellers of services, who hold different power positions in the chain. The relative power is conferred by ownership of critical assets or power resources such as the terminal, rail track and access rights. The powerful players will attempt to dominate the weaker ones by submitting them to their preferences; they make their objectives priority, regardless of whether such objectives are aligned with and contribute to the chain performance as a whole. In these interfaces, instability suppresses co-operation as each player focuses efforts on maximising the value that can appropriate rather than the actual interface efficiency.

In the power struggle, the powerful ones, be they the buyers or sellers, triumph and close the market in a sense that they create dependency in the weaker players (Taylor & Jackson, 2000). Market closure manifests itself in the form of switching costs preventing dissatisfied players from switching to alternatives or competitors.

Regrettably, these facets of the organisational interface are not well understood principally by the government nor are they well articulated in the literature. Vertically integrated organisations are more likely to overcome inefficiencies at the organisational interface since it controls all the interfaces. An open access terminal that is pursued in this study and is regarded as a mechanism through which the market power of a fully integrated organisation can be reduced to the benefit of the competition will be faced with the issues of power, conflict and instability in the chain.

f) **Chain Integration**

In recent years, co-operation agreements and vertical and horizontal integration among supply chain players have changed significantly the way intermodal chains operate. One driving force is the high level of cost efficiency that can be achieved due to the existence of economy of scale (Sd+D, 2004a, 2005). The danger, however, is that in the pursuit of profit, often the players in the chain focus on their own business segment and not on the seamless flow of goods through the system. This issue has received sufficient research attention over the last decade (Cox, 1997; Cox, 1999; Cox, Ireland, Lonsdale, Sanderson, & Watson, 2002; Emiliani, 2003)

This originates from the fact that intermodal transport involves a number of players with their own strategies and business goals, some of which may even conflict with the objectives of the systems. One important aspect that facilitates chain integration is information technology such as the use of internet, EDI and GPS systems, but again, overseas experience shows that most chains are characterised by information asymmetry, as players in the chain have different capabilities in information technology systems. Information is an important competitive weapon that is often kept within an individual player's jurisdiction even if sharing it would enhance the long term planning, development and sustainability of the chain.

g) **Ownership and Operation**

The models of ownership and operation of an intermodal terminal are summarised in the table below.

Table 1 - Terminal function matrix

Terminal Models	Terminal Functions		
	Regulator	Landowner	Operator
PUBLIC	Public	Public	Public
PUBLIC/private	Public	Public	Private
PRIVATE/public	Public	Private	Private
PRIVATE	Private	Private	Private

In the public terminal model, there is no private sector involvement. All three functions, regulator, landowner, and operator are the responsibility of the state. In OECD countries, such models are not used but they can be found in countries like Israel, Singapore and many developing countries.

The public/private and private/public models involve the private and public sectors. In both cases the public sector maintains the function of regulator but operations are privatised. The landlord function can be held either by the public sector or entrusted to private operators. Examples of these models are not uncommon in United States, Canada, Europe and Australia.

The final model is referred to as private because all functions - regulator, landowner and operators - are the responsibility of the private sector. With this model, the state has virtually no involvement other than to intervene when there is market failure. Even then, there have been a lot of questions as to whether government intervention is the universal panacea. Ports in the UK would appear to be virtually the only examples anywhere of this fully privatised model which lies at the extreme opposite end of the spectrum from the public model (Baird, 1995).

The general observation is that the most popular model for an open access terminal is the public/private in which the public sector owns the terminal and holds the role of regulator but the day-to-day operations are left in the hands of the private operator (Meyrick&Associates et al., 2006). The rationale is that this arrangement creates incentives for the government to be involved in the terminal planning process and development either through direct investment support, or by subsidising the operations. But the proponents of an open access terminal see the private/public model as the most attractive because by holding the property rights it allows the operator to plan, and build a terminal that fits the commercial objectives and is aligned with the operator's operating strategy (Baird, 1995; Hesse, 2002; Notteboom et al., 2004). There is, however, recognition that some sort of government funding and support will still be desirable at least to fund the construction of such an expensive infrastructure.

There is no evidence whatsoever that one model is absolutely better than others, nor is there evidence that public interest cannot be served well by the private sector. Real life examples suggest that the private sector with its commercial focus is well suited to operate the terminals, while the government can take a more positive role as a landlord and regulator to ensure that competition is enhanced and participation is guaranteed.

Obviously, the promotion of competition raises questions concerning how to best design regulatory mechanisms such that incentives for efficiency are increased while, at the same time, minimising the cost of regulatory burden. The issue of public or private ownership may not be relevant *per se* once an effective regulatory and legislative framework and policy are in place.

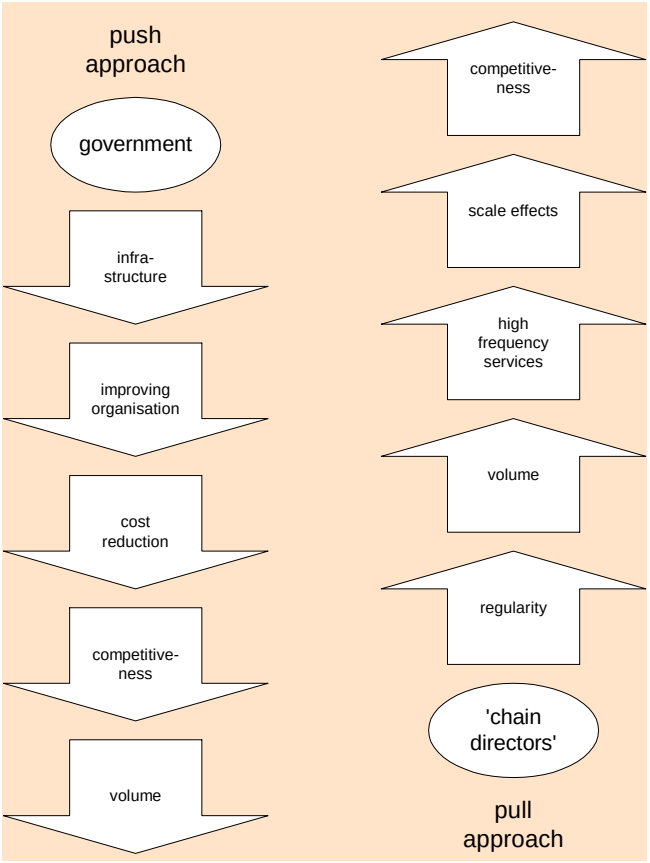
h) Promotion and Policy Issues

By now it should be apparent that the benefits of intermodal transport are significant and should be promoted. European experience demonstrates that governments have an important role to play in moving towards the objectives of balanced competition, social and spatial cohesion and environmental objectives. By stimulating intermodal transport, governments contribute towards more efficient use of energy, less strain on the environment, less congestion and wear on roads, more efficient land use, less traffic accidents, safer transport of hazardous cargo and better working conditions.

Government objectives to realise a shift from road to intermodal transport is an important statement but the *push approach* that it favours, may have to be combined with the *pull approach* that the industry prefers, if

the realisation of infrastructure is to be optimised and promote economic and social benefits (Henstra & Woxenius, 1999).

Figure 2 - Push versus pull approach to stimulating intermodal transport



At present the focus of policy making has been on the push approach. As shown in **Figure** 2 adjacent, the approach is essentially infrastructure driven. The government takes a long-term view of the demand to anticipate the provision of infrastructure. The key assumption is that the demand is inelastic, but the reality is different. Often, overcapacity will mean that distortions in the market as far as infrastructure pricing is concerned are introduced to recover the capital invested. The industry on the other hand tends to be on the conservative side, working its investment through to respond to changes in demand. For instance, if the industry commits itself to control large goods flows, in order to realise high frequency services and scale effects, the approach that would take would start with consolidating goods flows via road transport to make the step towards intermodal transport a smaller one compared to an at once transition to other modes. The approach uses an incremental rather than a step function.

Source: (Henstra et al., 1999)

Given the fact that the realisation of infrastructure is a time-consuming process, a combination of both approaches will always be necessary at the pull-push boundary. To bridge the gap between the two approaches the government should involve the market in objective setting and infrastructure investment and financing.

In the longer term, commercial supply of infrastructures e.g., through privatisation together with market pricing of access, should be encouraged to direct capacity extensions according to market demand.

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