

PORT SECURITY AND THE COST IMPLICATIONS

Ports are complex and multipart organisations in which institutions and functions intersect at various levels. It can be seen that the last twenty (20) years has experienced an explosion in maritime developments. Globally, the issue of port ownership has undergone a fundamental rethink. As the private sector has increased its interest in port operations so there has been a tendency towards concentration of ownership. Since the tragic events of 9/11, there has been a heightened sense of security worldwide. The terrorist attack on the French tanker *Limburg* off Yemen in October 2002 showed that immediate steps are necessary to enhance maritime security. But the cost of combating terrorism has come with a hefty price tag especially for developing economies. While the spin-offs and the economic benefits of the ISPS Code are:

- Lower possibilities of stowaways on board a vessel;
- Lower threat of piracy;
- Lower theft within the port;
- Increased cargo surveillance thereby reduces grey goods, drugs and other illegal items and
- Greater security within the port system; the cost of implementation has been costly.

INTRODUCTION

Good afternoon Ladies and Gentlemen. I would like to thank the organising committee for the invitation to speak today.

Albert Einstein once said that, “Intellectuals solve problems but a genius prevents them.” This afternoon I will try to be a genius by trying to keep you still stimulated this late in the afternoon.

Ports are complex and multipart organisations in which institutions and functions intersect at various levels¹. From the Workport Model (see figure one) adapted from A.K.C. Beresford et al we can see how some of the European ports have evolved over the last forty (40) years. Most of these changes experienced in the European ports are also applicable to our port system in South Africa.

It can be seen that the last twenty (20) years has experienced an explosion in maritime developments. Globally, the issue of port ownership has undergone a fundamental rethink. As the private sector has increased its interest in port operations so there has been a tendency towards concentration of ownership.

Unitisation of most cargoes has seen an ever-increasing number of container movements. Ports have had to increase infrastructure and superstructure to cater

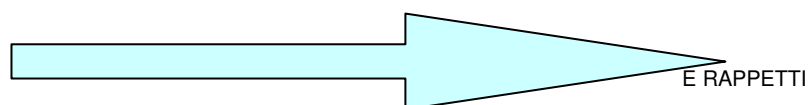
¹ Bichou, K. and Gray, R., 2004, A logistics and supply chain management approach to port performance measurement. Maritime policy and Management Vol.31, No1, p47-67.

for new, faster and larger container vessels wanting to optimise on economies of scale. There has also been greater emphasis placed on environmental issues with a number of conventions aimed at curbing the scourge of maritime pollution especially in the wake of the Exxon Valdez and more recently the Prestige incidents.

But in the area of maritime security, little was done, as there appeared to be no serious threats except concern in some quarter over the number of piracy incidents. However, the aftermath of the terror attacks on the United States of America (US) on 11 September 2001, has redefined some of these notions. Since September 11, the various stakeholders involved in ports have undertaken extensive initiatives to begin strengthening their security against potential terrorist threats. As might be expected given the national security aspects of the September 11 attacks, these activities have been most extensive at the federal level. However, states, port authorities, local agencies, and private companies have also been involved. The efforts extend across a broad spectrum of ports and port activities, but the levels of effort vary from location to location (Hecker: 2002). One of the greatest post-9/11 concerns is that terrorists will use the global supply chain to turn ocean cargo containers into weapons of mass destruction. Traditionally, the approach to supply chain security was focused on keeping the goods that were supposed to be in the box, in the box.

FIGURE 1: WORKPORT MODEL - COUNTING THE COSTS OF SECURITY

	1960s	1970s	1980s	1990s	2000s
Ownership	INCREASING PRIVATE SECTOR INVOLVMENT				
	Infrastructure mainly public sector owned		Privatisation of nationalised ports in UK	Greater concentration of container terminal ownership through partial acquisition by multinational terminal	
	SUBSTITUTION OF UNITISED FOR BREAKBULK CARGOES				
Cargo forms	Substitution of unitized methods for break bulk methods begins		Ships getting larger		Unitisation of general cargo almost complete
Cargo-handling Processes	INCREASING AUTOMATION AND MECHANIZATION				
	General cargo Dry bulk Highly mechanized Liquid bulk Highly mechanized and automated	Becoming increasingly mechanized Specialised terminals Specialised terminals	Increasing automation Fully automated	Full automation of quay and stack operations at a few container terminals (robotics)	
Cargo support	Communication,	Mail, Telephone,	Mail,	Mail, telephone,	Standardisation



Processes and Information Provision	documentation and information exchange Informal relationships between ports and port users	cable	telephone, fax, radio, telex	fax, telex, radio, EDI, internet, intranet	of information
Working culture <ul style="list-style-type: none"> Labour force Work organization Working environment Employment conditions Labour relations 	Break bulk cargoes labour intensive	Unitisation of general cargo operations leads to mechanized tasks being substituted for manual ones	Multi-skilling of core workforce. Flatter organizational structures. 24 hour working	Greater emphasis on quality aspect of services provided	Labour pools phased out
Port function/ Port development processes	Interchange point between land and sea	Increasing industrialisation	Diversification of port-based companies	Globalisation of port communities	Greater integration achieved
Environment	Generally low level of awareness	Reactive response to incidents	Specific legislation Increasing awareness Ad hoc local initiatives	Increasing proactive environmental management systems	Quality assured EMS Compliance plus environmental issues integrated into business plan
Decisive factors	Labour intensive	Capital intensive	Advances in technology and knowledge base	Information and communication technology	Integration of the interests of the whole community
Port Security				Some measures adopted in stemming piracy	Heightened security awareness ISPS Code implementation

Source: Adapted from A.K.C. Beresford et al

Since the tragic events of 9/11, there has been a heightened sense of security worldwide. The terrorist attack on the French tanker *Limburg* off Yemen in October 2002 showed that immediate steps are necessary to enhance maritime security. And so, the International Maritime Organisation (IMO) has adopted the International Ship and Port Facility Security (ISPS) Code. It is a set of new maritime regulations designed to help detect and deter threats to international security. This new and comprehensive security regime is of crucial significance not only to the international maritime community but the world community as a whole, as shipping is the centrepiece of world trade. But the cost of implementing such a system comes with a huge price tag. In South Africa, the National Ports Authority of SA estimating spending about R200 million on security upgrades. A figure now dwarfed by the recent government announcement of infrastructural spending over the next five years. But these costs would have to be recovered somehow. Before we determine this, we would need to look at the objectives of a pricing strategy and the role of the port.

Any transport charging framework should have the following key characteristics:

- (i) Comprehensibility – the structure should be clearly and easily understood by users whose behaviour it is meant to influence and should not impose undue transaction costs to identify the appropriate information;
- (ii) Transparency – the structure should provide clear information to users on the make-up of charges, and hence not confer undue advantage on particular industry participants, e.g. through information asymmetry;
- (iii) Stability – charges should not fluctuate or alter in an arbitrary or unpredictable manner, except where significant short-term cost changes are being signaled. If congestion (scarcity) pricing is introduced, short run prices could be unstable. However, future average levels could be projected in some cases by establishing a long-run avoidable cost around which short-run prices might be expected to fluctuate;
- (iv) Measurability, cost effectiveness and objectivity – the data required to derive charges should be objectively measurable, cost-effective to collect, and unambiguous to apply; and
- (v) Cost-reflectivity – the charges should be, to the extent possible, cost reflective in order to meet the objective of economic efficiency².

The pricing in the port sector should be based on the principle of long-term marginal social cost³, which also accounts for externalities relating to environment, congestion and accidents. This would encourage efficient use of existing facilities besides providing guidance on investment or disinvestments in port facilities and services. There are many other possible objectives, which may be assigned to a port pricing system. Prominent among these is the need to retain the benefits of port improvements within the country that undertakes the investment. A further pricing objective, which deserves attention, is that of building up financial reserves. This implies charging prices above resource costs that, in turn, may produce lower utilisation than is desired⁴. Table one highlights the costs associated with a ship when it arrives at a port. We can see that depending on the port's pricing strategy, the nature of the charges can vary as well as the charging base. The costs that are not adequately reflected are costs such as vessel tracking system (VTS) and security. In South Africa the VTS charges that have been implemented are fairly new. To date no security charge has been implemented.

² SUSTAINABLE TRANSPORT PRICING AND CHARGES: Principles and Issues (2000), UNCTAD publication.

³See UNCTAD Publication-TD/B/C.4/110/Rev.1 (1975), "Port Pricing", pp.8.

⁴ Juhel, M. H., 2000. *Port Pricing and Charges*. ESCAP-AITD Regional Seminar on Transport Pricing and Charges for Promoting Sustainable Development, New Delhi.

TABLE 1: PORT CHARGES ON SHIPS

Type of Charge	Nature of Charge	Charging Base	Basic Units	Charging System
Port dues on ships	For utilization of general port maritime facilities and services e.g. dredged channels/quays	Two-part tariff: size of ship; type of ship	Nrt and/or length	Flat rates for different sizes and types of ships
Pilotage	For piloting the ship	Size of ship	Nrt and/or length	Flat rates for different sizes or lengths of ships
Towage	For towing the ship	Size of ship	Nrt and/or length	Flat rates for different sizes or lengths of ships
Berthing	For line-handling during berthing and unberthing	Size of ship	Nrt and/or length	Flat rates for different sizes or lengths of ships
Berth occupancy	For occupation of a berth	Three-part tariff: size of ship; length of ship; berthing time	Nrt and/or length	Flat rates per day for different sizes and types of ships

Source: Meersman et al.

Given that the function of port pricing is to re-allocate benefits, it is necessary to specify the desired level of this allocation. This is a policy decision, which is likely to be peculiar to each individual port. Nevertheless, the upper and lower limits of the possibilities of re-allocation are, in principle, the same for all ports. At one extreme is the situation where the port is regarded as providing a service for which no charge is made. In such a situation, each user of the port would then retain in full the flow of benefits, which the use of the port yields to him, and the port entity would derive no revenue from the facilities and services, which it provides. At the other extreme, is the situation where all the benefits created by the port entity are tapped by the pricing system and converted into a revenue flow. Accordingly, the basic problem with which each port is faced is to determine the desired level of the re-allocation of benefits, i.e., the point between these two extremes, which is most consistent with the port's policy. For this purpose, two kinds of parameters may be introduced: these are constraints and objectives⁵.

⁵ See UNCTAD Publication-TD/B/C.4/110/Rev.1 (1975), "Port Pricing", pp.8.

Constraints are authoritative parameters, which have to be observed in any case. Objectives are indicative parameters, giving a direction or aim which may not be fully reached but which needs to be aspired to. Both contribute to the accurate definition of the port-pricing function.

Port pricing cannot be dealt with in isolation since pricing is a major factor in the implementation of a port's strategic plan. Pricing must be viewed as one element in a much broader port management concept. This concept has three elements. The first is a port's planning and development philosophy and a port's goals or objectives. The second is a port's investment criteria and policies. The third is a port's pricing policies and techniques. These three elements are closely interrelated. Significant change in any one of these three elements directly affects the other two elements. This means that a port's pricing approach should be supportive of the port's overall objectives, be consistent with the port's development and planning philosophy, and be a logical extension of the port's investment criteria and policies. There are three basic approaches that ports consider in formulating their pricing policies⁶.

The first is a purely economic approach, which argues for marginal cost pricing⁷. The second is a financial approach, which argues for prices to be set to recover fixed and variable costs and provide an adequate rate of return. The third approach is a public enterprise approach, which argues for prices to be set to recognise the need for the port to be a means to foster local development and existing local, regional and/or national economic activities. The third approach usually requires subsidisation by taxpayers or other port customers.

The economic approach would be used by ports that are primarily concerned with being self-supporting (breaking even). Ports that want to maximise profit as their main port goal would use the financial approach. Ports that are primarily concerned with maximising throughput and can afford to subsidise certain operations and functions in order to capture cargo would use the public enterprise approach⁸.

In the economic discipline, cost assessment of new schemes and initiatives is generally undertaken at three different levels of analysis⁹:

- First as a project appraisal and risk analysis of investment decisions, applicable to our case when new security provisions are translated into port investments. Here, discounted cash-flow (DCF) models are used to assess port profitability (Net present value-NPV and internal rate of return- IRR), and analyse uncertainty and risk associated with investment decision-makings (e.g. sensitivity analysis, dynamic and discrete modelling, simulation, etc.).

⁶ PORT PRICING: A PROCESS by Thomas J. Dowd (project A/FP-7 (Marine Advisory Services) from the National Oceanic and Atmospheric Administration to the Washington Sea Grant Program).

⁷ *Marginal Costs*: Marginal costs are specific variable costs related to the provision of a service or the use of infrastructure. Short-run marginal costs are the additional operating and maintenance costs associated with a marginal increase in output without any increase in physical capacity. If external costs are also included, this is referred to as marginal social cost. Long-run marginal costs include also the capital costs of increasing capacity to accommodate an increase in output; they are difficult to measure. Linking charges to long-run marginal costs would lead to significant inefficiencies where excess transport capacity exists.

⁸ Francois and Wooton (1999), Hummel (1999).

⁹ Bichou, k. (2004), "The ISPS code and the cost of port compliance: an initial logistics and supply chain framework for port security assessment and management", Centre for International Shipping and Logistics, University of Plymouth, Drake Circus, Plymouth.

- Second as a premium-price analysis, whereby new security costs are added to the price of port and shipping services. These costs are typically assessed by analysing market response to risk-return performance, referring for instance to the variations in freight rates and insurance premiums (Cullinane, 1991; Kavussanos & Marcoulis, 2001; Gong et. al, 2002).
- Third as a cost-benefit analysis (CBA) for optimal regulatory decision, becoming relevant to our case when ports want to know how far they need to adhere to non-mandatory security programmes. CBA is the most standard method to identifying the optimum benefit-to-cost ratio, usually by contrasting loss earnings or the cost of failure against the benefits of compliance (Dorfman, 1993). Alternative methods include cost efficiency analysis (CEA), a complementary method to CBA when the economic benefits cannot be quantified (Tietenberg, 2000), the revealed-preference method (RPM), and the stated preference method (SPM), both used to evaluate the monetary values of externalities and non-marketable goods (Ma, 2002).

Most ports and shipping companies have adopted one or the other pricing strategies in determining their new cost structures for implementing a security surcharge on the goods transported. Most of them now charge an extra fee on the Bill of Lading as well as an extra charge on every container handled. However, some of these charges seem unfair and discriminatory. For example, nothing has changed in the way the Bill of Lading is handled or has it.

The past two years has seen an every increasing demand for ocean going freight and hence an increase in freight costs. Could this be a reason why these security costs have been overshadowed? Whatever the reason, greater scrutiny will be needed in determining these costs. In South Africa there is pressure from government on the ports to reduce/review its cost structure. This means that the opportunity to introduce new cost structures requires a great deal of thought when the end result is to reduce overall transportation cost.

TRADE AND POLICY

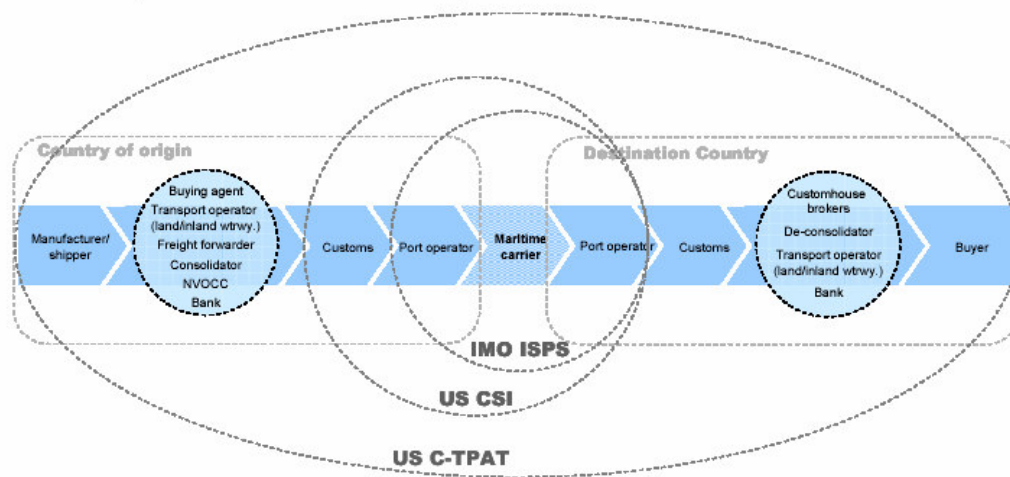
Members of the World Trade Organisation (WTO) have urged the United States of America (US) government not to allow its security related policies become an unnecessary barrier to trade or investment. The WTO's seventh Trade Policy Review of the United States reveals that several member governments have raised concerns about the cost of compliance with the new US security regime including the 24-hour rule and container security initiative. According to the report, "members urged the United States to implement security measures in the least trade restrictive manner". While the review is generally supportive of what it describes as an "open and highly efficient economy", it concludes that several barriers still exist in important areas of trade. Questions were posed in the report on customs fees, rules of origin, labeling requirements and trade restrictions; however it was the new US security-related measures that constituted a large part of the discussions.

While the WTO secretariat noted that they currently have no information to ascertain the economic impact of the new measures, the report stresses the importance of not allowing the new regime to become too restrictive¹⁰. This raises another interesting area of discussion in that trade and growth are synonymous with one another. Figure two shows the security framework that has been setup by the US. It is clearly evident that they have been able to shift their border. The restrictive impact of government policies is not fully understood¹¹.

The measures implemented by the US have also meant greater capital expenditure, which has been fairly costly especially for developing countries engaged in trade with the US. We can see the implementation of the CSI as well as the C-TPAT.

FIGURE 2:

**International Container Logistics Chain Vulnerability Assessment:
Scope of IMO and US Security Initiatives**



Notes:

CSI (Container Security Initiative)

C-TPAT (Customs Trade Partnership Against Terrorism)

Source: OECD Directorate for Science, Technology and Industry, Maritime Transport Committee (July 2003), "Security in Maritime Transport: Risks Factors and Economic Impact", (www.oecd.org).

¹⁰ www.lloydlist.com, News bulletin (23 November 2003).

¹¹ McGuire, Greg, Michael Schuele and Tina Smith (2000), "Restrictiveness of International Trade in Maritime Services," in C. Findlay and T. Warren (eds), *Impediments to Trade in Services: Measurement and Policy Implications*, (London: Routledge).

CONCLUSION

In conclusion, Ladies and Gentlemen, the advent of containerisation and the development of new generation type vessels were to have created greater economies of scale, faster turnaround times, lower average transportation costs and ease of transportation amongst others. To a greater degree, it has achieved most of the expected benefits however; it has also made it a threat because of its exposure to terrorism and armed piracy. Despite the temporary closure of regional ports in the New York area and the interdiction of certain ships in the immediate aftermath of the September 11 attacks, trade still flowed freely and the masses of containers and bulk commodities that fuel the world economy continued to flow unimpeded.

Here is a sector characterised by an extremely diverse international labour force, transporting a vast range of goods whose provenance, description and ownership are often left remarkably vague. This is a system where international transport chains involved thousands of intermediaries, on vessels registered in dozens of countries that sometimes choose not to uphold their international responsibilities and where some vessel owners can and do easily hide their true identities using a complex web of international corporate registration practices. Furthermore, this system had already displayed certain vulnerabilities in the past, especially with respect to its use for the illegal smuggling of drugs or banned goods. And yet this system remains absolutely essential for continued world trade and prosperity. For all of these reasons, the international transport of goods by sea quickly moved to the fore of the international agenda to combat terrorism¹².

But the cost of combating terrorism has come with a hefty price tag especially for developing economies. While the spin-offs and the economic benefits of the ISPS Code are:

- Lower possibilities of stowaways on board a vessel;
- Lower threat of piracy;
- Lower theft within the port;
- Increased cargo surveillance thereby reduces grey goods, drugs and other illegal items and
- Greater security within the port system; the cost of implementation has been costly.

The financial impact of meeting these capital outlays has meant the ports and shipping companies have had to introduce a security cost. These cost have however, been discriminatory and have been disguised by rising freight costs. The final impact of these charges on the end consumer have also been difficult to ascertain over the last two years because:

- depreciation of the USD against most currencies;
- greater economies of scale achieved by shipping lines;

¹² OECD Report (2003), "Security in the Maritime Transport: Risk Factors and Economic Impact", p4.

■ as previously mentioned, soaring freight cost.

It will only be possible over the next few years to determine the actual impact of all these charges within the transport network and their final impact on the end consumers. I thank you.