

# Measuring the effectiveness of border management: designing KPIs for outcomes

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## Abstract

This paper considers the problems associated with existing performance measures for border management and administration, and also the potential for leveraging supply chain processes to develop new integrated performance measures that are meaningful to business and border agencies. It explores the necessity for clear objectives that support the design of outcomes-based indicators and analyses the characteristics of effective performance measures. The paper concludes that an integrated performance measurement framework for border management can be developed on the basis of existing metrics. There is sufficient commonality of objectives to support an integrated approach that should improve the effectiveness and efficiency of international supply chains and border regulation.

## The importance of performance measurement for border management

The OECD has said that ‘good regulation’ should:

- i. serve clearly identified policy goals, and *be effective in achieving those goals*;
- ii. have a sound legal and empirical basis;
- iii. *produce benefits that justify costs*, considering the distribution of effects across society and taking economic, environmental and social effects into account;
- iv. *minimise costs* and market distortions;
- v. promote innovation through market incentives and goal-based approaches;
- vi. be clear, simple, and practical for users;
- vii. be consistent with other regulations and policies; and
- viii. be compatible as far as possible with competition, trade and investment-facilitating principles at domestic and international levels (OECD 2005, p. 3, emphasis added).

I have italicised those particular phrases in the guiding principles to emphasise the importance of being able to make an objective assessment of the impact of particular regulatory approaches. In other words, good regulation should, *inter alia*, lend itself to measurement of its performance as a tool of government. Has the regulation in question been effective in achieving objectives and does it produce benefits that justify the costs incurred in its implementation? This point is particularly well made by Sparrow:

Citizens should surely expect that government institutions whose core mission involves the reduction of harms should be able to give an account of their performance in terms of harms reduced, suppressed, mitigated or eliminated. All the more so if it is a regulatory agency, which imposes obligations, inconveniences, and costs on citizens and businesses. Those who are regulated have every right to know that regulatory impositions not only served worthwhile purposes, but were effective in achieving their aims. ‘If your business is harm-control, show me harms you have controlled’ (Sparrow 2008, p. 123).

Sparrow's observations are particularly apposite to border regulation which has been a growth industry for government since the events of 9/11. The various responses to supply chain security threats has led to an increase in the overall regulatory burden on those engaged in international trade but it has been difficult to determine if that regulation has actually improved the ability of governments to identify potentially high-risk consignments (Widdowson & Holloway 2009). As the authors point out in their conclusions, such regulatory initiatives should be carefully examined to ensure they are achieving a cost-effective outcome for both business and government (Widdowson & Holloway 2009, p. 39).

The evolving nature of supply chain security initiatives makes the measurement of their impact on trade transaction costs particularly problematic, notwithstanding the fact that better security results in improved trade, growth and development prospects (Bagai & Wilson 2006). As previously mentioned, security can also 'increase trade costs by requiring costly changes in business practices and new investment in technology and infrastructure. Limited implementation capacity in developing countries to comply with the new requirements can affect export competitiveness' (Bagai & Wilson 2006, p. 3).

It is axiomatic that performance measurement is a crucial component of good regulation but its importance to border regulation specifically can be highlighted by reference to some key characteristics of modern international trade and the supply chains that support that trade.

Time has always been a key aspect of trade competitiveness. As Hummels has pointed out, the need for business to hold stock in inventory at final destination as a buffer against volatility in demand or against delays in border clearance can represent a significant increase in capital costs. Even one day's increase in shipping time can be the equivalent of an additional 0.8% ad valorem tariff for a traded good (Hummels 2001). As a response to new supply chain security requirements, shippers are also adding extra cycle time to their supply chains (Bagai & Wilson 2006).

Arvis et al. highlight the fact that 'Induced costs are inversely related to predictability and also tend to rise steeply with declining logistics performance. For example, suppliers to the same automobile manufacturer will carry 7 days of inventory in Italy but 35 days in Morocco. Some retailers in African countries maintain 90 days or more inventory. Bangladesh has to ship, on average, 10% of its garment production by air to be certain to meet the schedules of European buyers (Arvis et al. 2008, p. 57).

Any addition to the time it takes to move goods from origin to final destination has a tendency to eat into a business's cash flow, quite apart from the capital cost associated with inventory as discussed by Hummels (2001). A slower supply chain is a less competitive supply chain that could mean the difference between the establishment of an export market or not. This 'time sensitivity' of international supply chains applies equally to imports and exports. For example, Li and Wilson have found that time to export is a significant determinant of comparative advantage (Li & Wilson 2009). They comment early in their policy research working paper that:

In industries having just-in-time business practices, for instance, the entire production process will come to a halt if even a single input is missing. In industries shifting toward a more fragmented process and relying on international supply chains, delays in the delivery of intermediates accrue in all successive production stages. Eventually, small transaction costs can amount to disproportionately large values. Time delays yield higher transaction costs for these time-sensitive industries, and, thus, disproportionately dampen their exports (Li & Wilson 2009, p. 2).

Taking into account the fact that intermediate inputs currently represent 56% of goods trade and 73% of services trade (Lanz, Ragoussis & Miroudot 2009), the magnitude of time delays on trade transaction costs can be readily imagined.

Border regulation is a major contributor to the temporal parameters of international trade. The actions taken by Customs and/or other government agencies at a country's borders or, indeed, prior to the arrival of the goods can be a positive or a negative influence on international supply chains. Complex,

duplicative, unpredictable processes will create additional time delays, increase costs and reduce the competitiveness of supply chains while processes that encourage and support pre-arrival clearance and post-transaction validation of trade transactions create a relatively neutral environment from a supply chain perspective, in the sense that (in the majority of cases) there is no physical interference with the cross-border flow of goods. In this latter respect, a government presence that is essentially invisible to traders, that is, a neutral influence on the supply chain, is a positive outcome in that context.

As the World Bank states in its most recent Logistics Performance Index (LPI):

...Excessive physical inspection or inappropriate reliance on inspector discretion causes large variations in clearance times, and multiple inspections are frequent. Increasingly strict safety and security measures impair service provision in all but the top-ranking countries...Efficient border management and coordination of the various agencies involved in border clearance is increasingly important. The performance of agencies responsible for enforcement of sanitary and phytosanitary regulation – and to a lesser extent other types of product standards – appears to lag well behind customs in many countries. LPI survey respondents rate the activities of such agencies as a major factor leading to additional, sometimes redundant, paperwork and inspection processes in the lowest performing countries (Arvis et al. 2010, p. 2).

This discussion of the potential impact of border regulation on supply chain competitiveness is not meant to detract from the underlying policy rationale for that regulation. A policy rationale such as national security must still be given proper effect by actions taken in relation to the border but my argument is rather that, given particular regulatory alternatives to achieve a stated policy objective, the decision should be to adopt that option which has a positive or neutral impact on international supply chains.

Returning to the theme of performance measurement, if the outcome of border regulation and administration can be positive or negative, it becomes important for both industry and government to be able to ascertain that fact in respect of any particular border initiative, for example, the customs clearance process. I refer to ‘outcome’ but it is more precise to call this the ‘net outcome’ because as I will argue further, there could and in most cases will be a combination of outcomes for particular border initiatives. Some of the outcomes will be positive, some negative, and some both positive and negative depending on the perspective from which the initiative is viewed. My argument is that it is important to capture all perspectives when analysing a particular border initiative and therefore the concept of a net outcome as an overall measure of regulatory performance has validity.

How then should the time taken for clearance of the goods be estimated? Is it appropriate to adopt a benchmark to estimate average clearance times and are there current approaches to performance measurement of border-related processes that can be effectively utilised for assessment of particular border initiatives? What is needed is an assessment of the total cost that a particular consignment has to bear through a variety of border and related processes up to the final destination, a question that has previously been posed with respect to the measurement of port performance (see Bichou & Gray 2004). Efficient and effective performance measurement is needed to support that assessment.

## **Existing approaches to performance measurement of border processes**

There are a number of existing approaches that provide some measurement of border clearance processes. Some approaches are broader in scope, for example, the World Bank’s ‘Doing Business’ surveys and ‘Logistics Performance Index’, while others such as the World Customs Organization’s (WCO’s) ‘Time Release Studies’ (TRS) are narrower in scope. There are also particular applications of performance measurement of border processes within defined regions, for example, the Trade and Transport Facilitation in Southeast Europe Program (TTFSE) and APEC’s review of progress with achieving a

5% reduction in trade transaction costs in APEC economies. Each of these approaches makes a valuable contribution to performance measurement of border processes but there is no single set of performance measures that posits a net outcome for business and government in combination.

## **Port performance indicators**

Performance indicators that are applied to processes within ports tend to be physical indicators, that is, they refer in some way to time and processes affecting ships. They will measure issues such as:

- Ship turnaround time
- Average ship waiting time
- Cargo dwell time<sup>1</sup>
- Productivity per crane-hour
- Tons per ship per day (Bichou & Gray 2004, p. 49; Bagai & Wilson 2006, p. 50).

These indicators do not analyse the regulatory processes at work within the port and are a snapshot of one aspect of the supply chain, that is, port efficiency and container movement through that node of the supply chain.

## **World Bank ‘Doing Business’ surveys: ‘Trading Across Borders’ segment**

The World Bank’s ‘Trading Across Borders’ segment includes time and cost (in fees and charges) measures for the movement of goods across borders, based on a hypothetical trade transaction for import and export.<sup>2</sup> The scope of the performance measures is determined by reference to the time and cost of completing several stages of the international logistics process, that is, preparation of documents, customs clearance and technical control, ports and terminal handling, and inland transportation and handling.

For the ‘Doing Business 2010’ report, raw data for the ‘Trading across Borders’ component was collected from around 1,455 respondents drawn from 183 economies (World Bank 2009). In each case the Bank estimates the number of documents, the time taken, and the cost per container for export and for import. Therefore, ‘[e]very official procedure for importing and exporting the goods is recorded – starting from the final contractual agreement between the two parties, and ending with the delivery of the goods. All documentation and signatures required for country clearance of the goods is also recorded. For importing the goods, the procedures measured range from the vessel’s arrival at the port of entry to the shipment’s delivery at the factory warehouse. For exporting the goods, the procedures measured range from the packing of the goods at the factory to their departure from the port of exit’ (Bagai & Wilson 2006, p. 16).

The ‘Trading Across Borders’ data therefore includes elements of port performance in its measures as well as the impact of border regulation; at least from the perspective of business. Nevertheless, there has been criticism of the methodology, that is, that the hypothetical nature of the transactions and the relatively small survey samples used for the collection of the raw data mean that there are question marks over the representativeness of the Bank’s estimates (World Bank 2008). I will return to this issue later in the article.

## **World Bank ‘Logistics Performance Index’**

The ‘Logistics Performance Index’ (LPI) is a qualitative measure of supply chain performance. It provides a global benchmark of logistics efficiency and service quality not treated specifically in the

'Doing Business' survey. It provides an assessment of trade logistics by collecting data on Customs, infrastructure, international shipments, logistics competence, tracking and tracing, domestic logistics costs, and timeliness, by examining trade procedures, infrastructure, services and reliability. The LPI is constructed from a worldwide survey of multinational freight forwarders and express carriers. Data is collected on seven aspects of logistics:

- Efficiency of the customs clearance process.
- Quality of trade and transport-related infrastructure.
- Ease of arranging competitively priced shipments.
- Competence and quality of logistics services.
- Ability to track and trace consignments.
- Frequency with which shipments reach the consignee within the scheduled or expected time (Arvis et al. 2010, p. 4).

The LPI is a particularly useful set of performance measures for supply chain managers but does not provide sufficient insight into the effectiveness of border initiatives, other than their impact on supply chain efficiency, for policy-makers.

Various trade logistics indicators are also identified by Bagai and Wilson:

- Clearance time: for imports, average time taken from when the goods arrive at the port of entry until the time they are claimed from customs
- Longest day to clear customs for imports: for imports, longest time taken from when the goods arrive at the port of entry until the time they are claimed from customs
- Release time of goods: normally from the time of arrival of goods at the port/airport/land border until their release to the importer or a third party on his behalf
- Transport time: the average time required to transport goods from the place of production/manufacturing/processing to the place from where the goods will be exported, or from the place of import to the final destination/distribution point or processing plant
- Transport cost: the total cost of transporting goods from the place of production/manufacturing/processing to the place from where the goods will be exported – or from the place of import to the final destination/distribution point or processing plant (Bagai & Wilson 2006, pp. 57-58).

## WCO Customs Time Release Studies (TRS)

In 2002, the WCO outlined a methodology to help customs administrations measure the time required for the release of goods as part of establishing the performance of the administration and the efficiency of the clearance process. The recommended methodology is relatively simple and is applied from the time of arrival of the goods at the port/airport/land border until their release to the importer or a third party on their behalf. The data is collected in a way that allows each stage of the customs clearance process to be analysed.

Its utility for identifying bottlenecks in the process of clearing goods, reasons and possible solutions to any problems as well as for comparative purposes has been recognised by trade researchers (Bagai & Wilson 2006, p.18) although the WCO has cautioned against its use for that latter purpose (WCO 2002, p. 2). The WCO's caution anticipates some reluctance on the part of Members to share/publish the results of individual TRS although some countries have published the outcomes on their website, for example, Australia.

Bagai and Wilson identify customs performance as one of the focal points of international trade:

Longer clearance times is [*sic*] normally associated with lower efficiency in port operations management, complex cumbersome procedures and higher transport costs due to high costs of

storage, etc. Reducing clearance requirements and guaranteeing fast and predictable release of goods is an important function of customs administrations (Bagai & Wilson 2006, p. 16).

As a key focal point for international trade they recognise that a well-performing customs administration will have a positive flow-on effect for trade and that TRS is an effective tool for performance improvement in that respect. Indeed, other commentators have highlighted TRS as a management tool for continuous improvement rather than as a stand-alone activity (Zhang 2009).

While acknowledging the central role that customs administrations play in relation to border management, it is important not to overlook the fact that they are not the only government agency that have border management responsibilities (Zhang 2009; Arvis et al. 2010). The World Bank has placed particular emphasis on this fact in the 2010 LPI:

In all performance groups, the time taken to clear goods through customs is a relatively small fraction of total import time...Core customs procedures converge strongly across all performance groups, but physical inspection – and even multiple inspections of the same shipment by different agencies – are much more common in low performance countries...A corollary of the gradual convergence of customs procedures worldwide is that other border agencies are seen to be an increasingly serious constraint on supply chain performance in many countries (Arvis et al. 2010, p. 16).

In his discussion of TRS as a measure of trade facilitation, Zhang agrees with Bagai and Wilson that Customs is a focal point in border management and control but that ‘Close communication and cooperation among all the stakeholders such as the national government, Customs, OGAs [other government agencies], donors, and the private sector, are integral to smooth implementation’ (Zhang 2009, p. 126). Indeed, he claims that ‘[i]n some countries, a Steering Committee at policy level or a TRS Reference Group involving the private sector may be set up to serve as a channel of engagement with the industry sectors and OGAs involved in the supply chain’ (Zhang 2009, p. 126).

Zhang states that TRS can be approached in one of two ways:

The first is to cover only the customs procedures, and the second is to cover the whole process of clearance. The first appears to be simple, as complicated coordination with other stakeholders can be bypassed. However, it is recognised by experts and demonstrated from past experience that it is better that a comprehensive TRS be conducted. The reasons are twofold: first, a comprehensive TRS will yield more useful findings, especially in helping to identify the bottlenecks in the procedures that are out of customs control. This is in line with the concept and practice of supply chain management. Second, coordination and communication among stakeholders during TRS will provide a sound basis for possible efforts to seek solutions and to take action to reform the process (Zhang 2009, p. 131).

The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) also supports the inclusion of all other border management agencies in the time measurement process as an adjunct to objectivity and completeness (UNESCAP 2009).

There can be little doubt that a whole-of-government TRS in the context of border management will provide a more accurate picture of overall performance and can be disaggregated to identify specific bottlenecks and/or other deficiencies in border-related processes. However, notwithstanding the value of such an approach, it is still necessary to inject some supply chain metrics to achieve a combined measure of border management effectiveness.

## **Trade and Transport Facilitation in Southeast Europe (TTFSE) Program – Regional application of border performance measures**

The Trade and Transport Facilitation in Southeast Europe Program (TTFSE) had as its objective the strengthening and modernising of the customs administrations and other border control agencies in the former Yugoslav Republic of Macedonia, Albania, Bosnia and Herzegovina, Bulgaria, Croatia, and Romania.

In particular the program was intended ‘to reduce non-tariff costs to trade and transport; and to prevent smuggling and corruption at border crossings. There are five project components. The first improves customs procedures, assists streamline operations at three border posts and one inland terminal on a pilot basis; provides customs training in new procedures, and trains for agency awareness and cooperation; and restructures the customs administration. The second component provides technical assistance and advisory services to trade and international transport participants through the European chamber; improves communication between border control agencies and trading community by using a virtual forum; and supplies equipment. The third component improves information system, provides personnel training, and stimulates regional and inter-agency cooperation. The fourth component improves border crossing facilities. The fifth component includes the services to support program implementation’.<sup>3</sup>

The relevance of the TTFSE program to this research is its development of key performance indicators (KPIs) for monitoring the implementation and impact of the program. Those KPIs as outlined by Bagai and Wilson are:

### **KPIs at Pilot Inland Terminals**

- Import clearance time - time between entrance of truck into the terminal and release of goods (minutes)
- Physical examination - number of times that goods are examined or the cargo compartment is searched compared to the total number of import, export and suspense declarations (%)
- Trucks cleared in less than 15 minutes - number of times that a truck completes import clearance in less than 15 minutes compared to the total number of import clearances (%)
- Irregularities/Number of examinations - number of examinations discovered during physical examinations compared to the total number of physical examinations carried out (%).

### **KPIs at Pilot Border Crossings**

- Truck examination - number of trucks actually opened (that is, seals broken) compared to the total number of trucks processed (%)
- Irregularities/number of examinations: number of irregularities discovered during examinations compared to the total number of trucks examined (%)
- Average border exit time: for trucks exiting the country, it is the time between joining the queue and crossing the border (minutes)
- Average border entry time: for trucks entering the country, it is the time between crossing the border and departing the station (minutes)
- Surveyed occurrence of corruption: number of cases when a driver makes or is asked to make an unauthorised payment compared to the total number of trucks/locations surveyed.

### **KPIs of Customs Efficiency (Ratios)**

- Revenue collected/customs staff: total revenues collected/total number of customs employees
- Total customs administration cost/revenue collected: total budget of the administration (including salaries, overtime, bonuses and benefits)/total revenue collected irrespective of its destination

- Revenue collected/salaries: total agency salaries, overtime bonuses and benefits/total revenue collected irrespective of its destination
- Trade volume/customs staff: trade volume/number of customs employees
- Annual number of declarations/customs staff: total number of declarations (import, export, suspense regimes, but excluding transit) irrespective of the number of items/total staff employed by Customs (Bagai & Wilson 2006).

In addition, annual user surveys were conducted to supplement the KPI measurements. In essence, the data obtained from these KPIs provided twin measures of customs efficiency in Southeast Europe and border crossing and clearance times from the user perspective at pilot sites.

### Problems with existing performance measures

Taking a supply chain perspective for the moment, sourcing decisions are generally made on the basis of the concept of ‘total landed cost’.<sup>4</sup> Border administration (including the calculation of duties) is an important component of total landed cost but can be difficult to assess, particularly in an environment of multiple trade agreements (Lee 2010). Supply chain security initiatives further complicate the calculation of total landed cost. Lee comments that:

This process can also become even more complex when some nations, such as the United States, are concerned with the threat of security when container shipments can be used by terrorists as a weapon of mass destruction. The result is added documentation requirements, inspection, and delays. In the total landed cost analysis, the logistics and transaction costs, and the inventory holding costs, can be greatly affected by the cross-border processes. For example, if such processes are long and unreliable, then the inventory in transit will be high, and the safety stocks that the importing company need to carry would have to be increased (Lee 2010, p. 178).

Despite the significance of border regulation and administration, there is currently no holistic approach to measuring the performance of border initiatives. Current approaches, in most cases, do not describe how to measure ‘outcomes’ as they relate to the various stakeholders, both public and private, but rather focus mainly on border processes, such as clearance times. For example, the cross-country indices produced by the World Bank provide important insights into the performance of border processes but are essentially measures of outputs rather than outcomes (IEG 2008).

The World Bank indices are compiled from surveys that target the private sector experience of the border clearance process. They do not include a regulatory agency perspective of that process and are not intended to measure the broader effectiveness of particular border regulation initiatives. By comparison, TRS programs provide an effective measure of customs performance at the border and have the potential to be expanded to provide a cross-agency performance measure provided that it is designed to allow for disaggregation but is less useful for business seeking information about supply chain performance or the impact of border regulation initiatives on supply chain efficiency. There are shortcomings with both sets of measures depending on the user’s perspective.

The World Bank’s ‘Doing Business’ survey has been questioned over some of its methodologies. An independent evaluation of the survey was conducted for the World Bank in 2008 by the Independent Evaluation Group (IEG).<sup>5</sup> Some of the weaknesses identified by IEG included:

Many other factors affect macroeconomic outcomes, and the direction of causality between regulation and economic outcomes is very difficult to isolate. Since regulations generate social benefits as well as private costs, what is good for an individual firm is not necessarily good for the economy or society as a whole. Therefore, policy implications are not always clear-cut, and the right level and type of regulation is a matter of policy choice in each country (IEG 2008, p. xv).

First, the data are provided by few informants, with some data points for a country generated by just

one or two firms...Second...[it is] insufficiently transparent about the number and types of informants for each indicator, the adjustments its staff make to the data received from informants, and the changes made to previously published data and their effects on the rankings...Third, DB makes much of its country rankings. The rankings entail three weaknesses. First, because most of the indicators presume that less regulation is better, it is difficult to tell whether the top-ranked countries have good and efficient regulations or simply inadequate regulation. Second, the small informant base makes it difficult to measure confidence in the accuracy of the individual indicator values, and thus in the aggregate rankings. Third, changes in a country's ranking depend importantly on where it sits on the distribution: small changes can produce large ratings jumps, and vice versa (IEG 2008, p. xvi).

The overall conclusion by IEG in this regard was that the 'Doing Business' survey measures the costs but not the benefits of regulation.

The utility of TRS as a broader measure of performance is dependent on its scope, that is, does it cover only the customs procedures or the whole process of clearance including other border agencies? (Zhang 2009) .An additional problem with TRS is that there is no commonly accepted definition of customs clearance times nor is there a standard methodology for calculating the days required to clear customs at national points of entry on a time series basis (Bagai & Wilson 2006). To quote the examples used by Bagai and Wilson: 'The ICAs calculation is based on firm level surveys, while TTFSE measures clearance at the border. There is a discrepancy between firm surveys and on the ground interviews and observations. For Uzbekistan, WBES gives an average clearance time of 11 days compared to 5 days by UNESCAP' (Bagai & Wilson 2006, p. 41).

Furthermore, while the importance of involving all border agencies in performance measurement has been acknowledged, it must also be acknowledged that the involvement of different agencies in the clearance process can yield different results in baseline calculations of customs clearance (Bagai & Wilson 2006).

The approach to performance measurement adopted as part of the TTFSE program includes the usual time measures but interestingly, adds measures that look at the numbers of physical examinations and any irregularities that are discovered as part of that process. This measure allows border administrations to make some assessment of the effectiveness of their risk management profiles and is therefore a measure of outcomes as well as outputs. It is also a measure that is meaningful to both business and government. As stated by the World Bank in its LPI '[e]xcessive physical inspection or inappropriate reliance on inspector discretion causes large variations in clearance times, and multiple inspections are frequent' (Arvis et al. 2010, p. 2). A performance indicator such as this not only tells business something about clearance times but provides some reasons why.

Unfortunately, there is a natural tendency for border agencies to measure outputs rather than outcomes. This is well demonstrated in relation to enforcement-type measures, for example, amount of drugs seized over a period of time rather than any assessment of whether or not a particular drug strategy has been effective. As Willis, Anderson and Davis state when commenting on performance measures published by Australian Customs and Border Protection in relation to drug enforcement: 'While the small number of drug seizure indicator data form an important part of regular, formal agency monitoring and reporting processes (such as the agency's annual report), other drug market data (for example, drug purity and price) and social harm data are chiefly used informally and are not publicly reported' (Willis, Anderson & Davis 2010, p. 4).

Citing an earlier report the authors observe that 'As outlined in Willis, Homel and Gray (2006), traditional measures of law enforcement performance focus on crime rates, arrests, seizures and clearance rates as key measures of success. Such measures are simple, visible and easily understood measures of police effort, although they can provide ambiguous results and do not tell the "full story". Essentially, they demonstrate the extent to which police engage in certain types of activities and how they allocate

resources. They have only a small amount to say in terms of the complexities of law enforcement work and the broader impacts of law enforcement effort' (Willis, Homel & Anderson 2010, p. 6).

The authors quote the Parliamentary Joint Committee on the Australian Crime Commission to emphasise this point:

It has always struck the Committee...that we have a less informed knowledge base in one of the most important areas of social and public policy in Australia – that is, law enforcement – than in almost any other area...we do not have national benchmarking enabling the community to make intelligent, strategic, long-term judgements about the threats that face the law enforcement environment... We need to develop effective measuring devices in law enforcement that enable us to make better judgements about where limited resources should be applied...where there are very large expenditures of public resources we need to be able to better distinguish between those areas which need further enhancement and those where we will face the law of diminishing returns (House of Representatives 2007)' (Willis, Homel & Anderson 2010, p. 7).

Those comments are apposite for the performance measures currently being adopted in relation to border management. The 'full story' of border management is not being told and isn't being told to the whole audience (business and government in combination). If 'efficient border management and coordination of the various agencies involved in border clearance is increasingly important' (Arvis et al. 2010, p. 2) then this must be acknowledged in the performance measures being designed to evidence that new efficiency. Of course, achieving a true collaboration in border management is not just about coordination of the various agencies involved in border clearance but also about involving business stakeholders in the design and implementation of those measures.

At this time there are few performance measures that provide that three-dimensional view of border management from a combined (that is, government and business) perspective. There is valuable data contained within international supply chains. This has been recognised in the various supply chain security initiatives that have been implemented, particularly those requiring advance cargo information such as the US Advanced Manifest Rule. There is less evidence of that data being leveraged by border agencies to measure their performance or as a basis for closer integration between business and border agency databases.

Bagai and Wilson summarise the limitations of available data. They do so in the context of the impact of trade costs and facilitation on competitiveness but the summary is equally applicable to the border management context:

- Lack of harmonized definitions and measurement tools which can lead to different indicators of the same barriers
- Limited country coverage
- Poor quality data that can be difficult or impossible to replicate
- Lack of time series data sets
- Aggregation of various data sources is problematic or impossible
- Difficulty to use same indicators for cross-country analysis and for measuring project performance (Bagai & Wilson 2006, pp. 40-41).

I respectfully agree with the authors' observation that the international supply chain sequence provides a useful frame of reference when designing performance measures, and assert that this is just as valid for measuring the effectiveness of border management initiatives as it is for capturing progress in trade facilitation. Border administrations in adopting 'layered' approaches to supply chain security are pushing regulation further upstream in the supply chain, so it makes sense to understand the different nodes that operate within international supply chains and leverage that information for the benefit of government and business. I return to this theme in a subsequent section of the article.

## Integrating border performance with supply chain performance

One of the key conclusions that can be drawn from the World Bank's LPI is that 'although costs and timeliness are of paramount importance, traders are primarily concerned with the overall reliability of the supply chain' (Arvis et al. 2008, p. 54). They are also concerned at the degree of 'friction' that is imposed by cross-border processes (Lee 2010, citing Hausman et al.). In other words, while the performance of public agencies is one factor in logistics performance, it is certainly not the only one. As Arvis et al. go on to say:

Although performance outcomes such as domestic costs or the time taken to reach a destination are important, traders mostly value the performance of logistics services available to them: the reliability and predictability of the supply chain matters most. For example, traditional measures of performance such as direct freight costs and average delays, while important, may not capture the overall logistics performance and thus the ability of countries to use trade for growth. The predictability and reliability of shipments, while more difficult to measure, are more important for firms and may have a more dramatic impact on their ability to compete.

Indeed, professionals view the friendliness of border processes primarily in terms of the transparency and the predictability of clearance procedures. Even where countries have already implemented a customs modernization program, the coordination of border procedures between customs and other agencies... is an important concern (Arvis et al. 2008, pp. 54-55).

If reliability and predictability of the supply chain are most important to traders then they need to be captured in some form in performance measures being applied to border management. Predictability that flows from better coordination between border agencies provides a more robust source of information for use by those same agencies in their risk assessments of particular trade transactions. In other words, there is the potential for a 'win-win' outcome through the acknowledgment of a key performance factor for business when designing border regulation and its associated performance measures.

This returns us to the theme that performance measures should be meaningful across relevant stakeholder groups, in this case, government, the relevant border agency, traders and the public. This requires performance measures that can be disaggregated, that is, measures that allow determination of policy outcomes but contain sufficient granularity to provide insight into more specific issues such as delays in clearance, the effectiveness of risk profiles or the effectiveness of coordination between border agencies.

By way of illustration: it is common for customs administrations to act as 'agent' of other government agencies at the border with the consequence that customs 'inherits' any inefficiencies that exist within the 'delegating' agency process and is often (unfairly) perceived by traders or passengers as the cause of any delay. One could therefore argue that customs has a vested interest in designing performance indicators that are capable of being disaggregated into border processes 'controlled' by Customs and those which are outside their control.

A more three-dimensional approach to performance measurement necessarily implies better integration between border (regulatory) performance and supply chain performance. In this way the impact of particular border management initiatives on the efficiency of international supply chains can be assessed, as can the effectiveness of the border management initiative in achieving particular policy objectives such as border security. As Lee states, '...it is important for governments and companies to work on reducing both the mean and variance of times and costs of cross-border trade processes' and further on, citing Hausman et al., '...the results can be used to see the benefits from reducing total process times... Trade-related processing time and cost can also be improved by re-engineering processes to eliminate unnecessary steps and streamline others (such as by introducing more parallel processing rather than sequential processing, introducing advanced information technologies (such as electronic customs clearance and documentation flows), using data mining and screening methods to identify only

high-risk containers for security inspections, and adopting advanced scanning technologies to shorten cargo inspection times' (Lee 2010, p. 184).

Problems with current performance measurement approaches and the potential benefits of an approach that produces meaningful information for traders and regulators lead naturally to consideration of an integrated performance measurement framework. Is such integration possible?

### An 'integrated' performance measurement framework

I contend that an integrated performance measurement framework is possible. Matsumoto and Lee discuss a range of key performance indicators that are useful for business and government utilising the processes contained within international supply chains as a frame of reference (Matsumoto & Lee 2007). They do so in the context of trade facilitation but the analysis is equally applicable to border management and adopts a time and cost breakdown for each step in the border clearance process. The authors separately describe performance indicators that have utility for the private sector and government respectively. Thus, performance indicators suggested as being useful in assessing the impact of initiatives on the private sector include:

- cost of processing trade and customs documentation
- time taken to get trade documents approved
- number of staff needed to process and handle trade documentation and customs
- cargo clearance time
- amount of stock enterprises have to carry.

Suggested indicators for government directed towards assessment of regulatory compliance, data accuracy and efficient resource usage include:

- number of trade officers involved in processing trade documents
- number of enforcement officers as a ratio of trade and cargo volume
- rate of traders' compliance with the documentation requirements
- accuracy in classification of trade data
- accurate information in documents
- compliance with rules of origin
- correct payment of duties (Matsumoto & Lee 2007, pp. 189-90).

It should be possible to develop a matrix of performance measures that integrate government and private sector indicators. Some indicators will be specific to the private sector and others to government but there are indicators that can be rationalised in favour of an 'integrated' indicator, for example, time taken to process clearance documentation which can combine the private sector 'cost of processing trade and customs documentation' and 'number of trade officers involved in processing trade documents' to provide an overall (and cross-agency) measure of clearance processing performance. The problem with the current approach of having two or more separate indicators for essentially the same process is that it is quite likely to throw up different results due to the different perspective.

The key to integrating supply chain and border regulation performance measures is the development of high-level outcomes that are relevant to government and private sector objectives, for example, transparency is an objective that is important to both business and government. The specification of high-level outcomes then underpins and informs the development of key performance indicators possessing particular characteristics. A useful model in this regard is that developed by Willis, Homel and Anderson in support of the National Drug Law Enforcement Performance Measurement Framework (Willis, Homel & Anderson 2010).

The model developed by Willis, Homel and Anderson (2010) is built around four high-level outcomes and 'includes a process for adapting the performance measurement framework to accommodate the specific needs of drug law enforcement agencies operating in different settings in Australia'.

In the specific instance of drug law enforcement those four high-level outcomes were identified as: reducing drug crime and drug-related crime; reducing organised crime; improving public health and improving public amenity. Specific performance measures associated with each outcome were then defined on the basis of certain characteristics, that is:

- Clear in their purpose (that is, who will be using the information and how and why it will be used)
- Useful (in gauging the effectiveness of policies and strategies)
- Valid (measure what they should measure)
- Reliable (give consistent results)
- Easy to interpret (make sense and reflect real events)
- Easy to construct (reflect the real places they are used in)
- Consistent with other performance indicators in the National Drug Strategy (that is, aligned with the wider drugs policy environment)
- Easy to adapt to different settings and develop over time (Willis, Homel & Anderson 2010, p. 1).

If the same model is adapted for border management the high-level outcomes might be, for example, to reduce the time taken for border clearance; reduce the total cost for import- and export-related transactions; simplify the border clearance process; identify and interdict high-risk cargo.

Against those high-level outcomes, specific performance measures might then be developed as follows:

### **Time**

- Total time for the trade transaction
- Time taken to process relevant documentation
- Border (not just customs) clearance time (perhaps relying on TRS methodology)
- Average time for all procedures (import and export)
- Physical examination - number of times that goods are examined compared to the total number of declarations (%)
- Time taken for inspection (physical and non-physical)

### **Cost**

- Total cost for a trade transaction
- Total cost of import- and export-related procedures
- Port and terminal charges (for example, demurrage)
- Revenue collected/customs or all border agency staff: total revenues collected/total number of customs employees

### **Simplification**

- The number of signatures (approvals) for a trade transaction
- The number of documents required for border clearance
- The number of documents required for a trade transaction
- The number of agency approvals required for specific transactions
- The amount of 'churn' in border clearance, that is, how much multiple handling of documentation occurs (versus once-only communication)

- Percentage of relevant data traders can access electronically
- Percentage of just-in-time data exchange

### Risk

- Percentage of containers examined by non-intrusive means (for example, X-ray) as a ratio of trade volume
- Percentage of containers physically examined as a ratio of trade volume and as a ratio of non-intrusive examinations
- Number of detections during examinations as a ratio of the total number of physical and non-intrusive examinations (provides some indication of risk profile effectiveness).

The achievement of an integrated performance measurement framework for border management therefore requires a linkage between strategic objectives and priorities in respect of both the private sector and border agencies so that progress against those overall objectives can be monitored (Willis, Homel & Anderson 2010). This linkage can be extended to international initiatives, for example, the WCO SAFE Framework in respect of supply chain security or ISO standards. A preliminary focus on ‘cross-cutting’ objectives will necessarily move the emphasis away from the type of activities or processes being undertaken to the measurement of the changes that these activities and processes are expected to effect, for example, reduction in border clearance time (see also OECD 2010).

As Willis et al. state: ‘To be sound the measures should relate well to the actual phenomena occurring and be focused on the objectives being sought. Experience has shown that finding sound measures for complex systems, such as border security, requires a coherent conceptual understanding of the objectives that the system is designed to achieve, the dynamics of the phenomena that threaten those objectives, and how operational programs influence the threats to the objectives’ (Willis et al. 2010, p. 5).

Otley outlines five questions that must be asked of and answered by any performance measurement system:

1. What are the key objectives that are central to the organization’s overall future success, and how does it go about evaluating its achievement for each of these objectives?
2. What strategies and plans has the organization adopted and what are the processes and activities that it has decided will be required for it to successfully implement these? How does it assess and measure the performance of these activities?
3. What level of performance does the organization need to achieve in each of the areas defined in the above two questions, and how does it go about setting appropriate performance targets for them?
4. What rewards will managers (and other employees) gain by achieving these performance targets (or, conversely, what penalties will they suffer by failing to achieve them)?
5. What are the information flows (feedback and feed-forward loops) that are necessary to enable the organization to learn from its experience, and to adapt its current behaviour in the light of that experience? (Otley 1999, pp. 363-82).

These questions are equally appropriate when one broadens the context to border management generally rather than single organisations involved in that process.

## The design of key performance indicators (KPIs) for an integrated framework

The previous discussion has suggested a number of key performance indicators (KPIs) that in combination can deliver an integrated performance measurement approach to border management but is it possible to describe the essential characteristics of such KPIs without being definitive about their specific parameters? Willis et al. express the view that ‘if possible, the measures should be sufficiently general so that they can be used to make comparisons across modes of transportation (land, sea, and air), program types, agencies, and geographic regions’ (Willis et al. 2010, p. 6). This reiterates the view expressed throughout that all border agencies, not just customs administrations, be included in any border performance measurement framework.

Within that broader context of comparability, KPIs can exhibit one of two temporal characteristics, that is, they can be ‘lagging’ indicators which measure a variable at the end of a process or a consequence of applied strategies (for example, revenue collected, drugs interdicted, seizures) or they can be ‘leading’ indicators measuring variables during the process and used to determine progress against milestones or objectives (for example, effectiveness, quality, cycle time, implementation of compliance programs).

Lagging indicators tend to be the more popular among border administrations and therefore achieve some uniformity across different administrations (for example, clearance time, as noted previously), while lead indicators tend to be designed more specifically to address the particular needs and objectives of particular border administrations. This renders lead indicators more problematic for comparison purposes, notwithstanding that they have far more potential as indicators of outcomes rather than outputs. Is it possible therefore to promote more uniformity among leading indicators to encourage their use within an integrated performance measurement framework for border management? I believe that it is possible to achieve this to some degree.

If lead indicators are designed by reference to a multilateral border/supply chain framework such as the WCO’s SAFE Framework of Standards, it is possible to attract some uniformity. Individual border administrations and supply chain participants that benchmark their KPIs against the SAFE Framework of Standards achieve a measure of comparability and an outcomes focus.

An effective performance measurement approach for border management will have an appropriate mix of lagging and leading indicators among its KPIs. A statement of outcomes that doesn’t also include leading indicators will not communicate how those outcomes are to be achieved nor will it provide a progress report on whether or not the particular strategy is being successfully implemented. Conversely, the addition of lagging indicators will allow analysts to go behind the information provided by the lead indicators to establish the reasons for different levels of performance and contribute to the evaluation and adjustment of strategies (Trosa & Williams 1996; OECD 2010).

The performance indicators for border management should be sufficient to provide a meaningful picture of efficiency and effectiveness against the stated objectives but not be so many or so complex as to become costly and unmanageable. If there are too many KPIs the border administration will spend more time gathering information than analysing it. The principles against which KPI design should be judged are set out by the OECD: they should ‘give a precise definition of the intervention logic, providing an operational description of the overall objective, purpose and results in terms of the variable (what will change?), target value (how much?), target groups/beneficiaries (who/whom?) and time (by when?)’ (OECD 2010, p. 7). This means that the selection of KPIs should not be dictated by the fact that they may be easy to measure or have been used previously but rather that they deliver a meaningful indication of outcomes related to objectives.

An example used by Trosa and Williams illustrates this very well and I repeat it here:

[W]hen Australia Post first developed an indicator to measure performance of its mail sorting centres, it chose a simple, easily quantifiable, measure of output – the number of letters sorted in a day. A perverse consequence was that in some cases, pre-sorted mail was sorted again to boost apparent performance. Mail delivery was consequently slower. The performance indicator now used is the percentage of mail delivered on time from mail box to addressee, timeliness of mail delivery being important to clients (Trosa & Williams 1996, p. 49).

The requirement for data to inform KPIs can of course impose its own costs on government and the private sector. It is therefore important that KPIs utilise existing data sources as much as possible (OECD 2010). To use an analogy, dipping into an information stream that already exists (say, as part of logistics processes) is preferable to creating an entirely new stream of information. This becomes a simple cost/benefit exercise. Similarly, poor quality data does not assist effective performance measurement even in real-time (IBM 2006). Innovations in information and communications technology are helping to overcome data quality deficits. As the IBM report highlights, ‘Public-private information sharing mechanisms pool data collected between Customs and the trading community. This feature shifts information exchange from multiple, one-to-one relationships to just-in-time data accessibility. TradeNet in Singapore; Felixstowe in the UK and 1-Stop.Biz in Australia have all implemented community portals to enable “advanced information” and pre-filing’ (IBM 2006, pp. 25-26).

## Conclusions

It is possible to develop an integrated performance measurement framework for border management that is meaningful for business and government. At levels ranging from the determination of objectives through the design of KPIs and gathering of data to support them, it is possible to discern common themes capable of supporting an integrated approach that improves the effectiveness and efficiency of international supply chains and border regulation.

## References

- Arvis, J, Mustra, MA, Ojala, L, Shepherd, B & Saslavsky, D 2010, *Connecting to compete 2010: trade logistics in the global economy: the logistics performance index and its indicators*, International Bank for Reconstruction and Development/The World Bank, Washington, DC.
- Arvis, J, Mustra, M, Panzer, J, Ojala, L & Naula, T 2008, ‘Connecting to compete: trade logistics in the global economy’, Ch. 1.4, *Global enabling trade report 2008*, World Economic Forum, Davos, Switzerland.
- Bagai, S & Wilson, JS 2006, ‘The data chase: what’s out there on trade costs and nontariff barriers?’, World Bank Policy Research Working Paper 3899, April, World Bank, Washington, DC, <http://econ.worldbank.org>.
- Bichou, K & Gray, R 2004, ‘A logistics and supply chain management approach to port performance measurement’, *Maritime Policy Management*, January-March, vol. 31, no. 1, pp. 47-67. (ISSN 1464-5254)
- Hummels, D 2001, ‘Time as a trade barrier’, GTAP Working Papers 1152, Center for Global Trade Analysis, Department of Agricultural Economics, Purdue University, IN.
- IBM 2006, *Border management in the new century: emerging trends and best practices*, IBM Global Business Services, New York, NY.

- IEG (Independent Evaluation Group) 2008, 'Doing business: an independent evaluation, taking the measure of the World Bank-IFC Doing Business Indicators', The World Bank, Washington, DC. (DOI:10.1596/978-0-8213-7552-5)
- Lanz, R, Ragoussis, A, & Miroudot, S 2009, 'Trade in intermediate goods and services', OECD Trade Policy Working Papers, No. 93, OECD Publishing. (DOI: 10.1787/5kmlcxtldk8r-en)
- Lee, HL 2010, 'A long review of research and practice in operations research and management science', International Series in Operations Research & Management Science 148, eds MS Sodhi & CS Tang, Springer Science and Business Media, LLC. (DOI 10.1007/978-1-4419-6810-4\_10)
- Li, Yue & Wilson, JS 2009, 'Time as a determinant of comparative advantage', World Bank Policy Research Working Paper WPS5128, November, World Bank, Washington, DC.
- Matsumoto, T & Lee, SH 2007, 'Regional best practice on Time Release Study', WCO Regional Office for Capacity Building, Bangkok, Thailand, viewed 7 September 2010, [www.wcoomd.org/files/1.%20Public%20files/PDFandDocuments/Procedures%20and%20Facilitation/Time\\_Release%20\\_Study\\_ENG.pdf](http://www.wcoomd.org/files/1.%20Public%20files/PDFandDocuments/Procedures%20and%20Facilitation/Time_Release%20_Study_ENG.pdf).
- OECD (Organisation for Economic Co-operation and Development) 2005, '*OECD Guiding principles for regulatory quality and performance*', viewed 19 August 2010, [www.oecd.org/dataoecd/19/51/37318586.pdf](http://www.oecd.org/dataoecd/19/51/37318586.pdf).
- OECD (Organisation for Economic Co-operation and Development) 2010, 'Indicators to measure the performance of a national SPS system', STDF/OECD Working Paper (Draft): for discussion at the STDF/OECD Technical Working Meeting on SPS Indicators World Trade Organization, Geneva, 1 July, viewed 11 June 2010, STDF/Coord/293/Working Paper Draft Rev. 2.
- Otley, D 1999, 'Performance management: a framework for management control systems research', *Management Accounting Research*, vol. 10, pp. 363-82.
- Trade and Transport Facilitation in Southeast Europe Program (TTFSE), World Bank, Washington, DC, [www.seerecon.org/ttfse](http://www.seerecon.org/ttfse).
- Trosa, S & Williams, S 1996, 'Benchmarking in public sector performance management', Department of Finance, Commonwealth of Australia, Canberra, ACT.
- UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific) 2009, '*Designing and implementing trade facilitation in Asia and the Pacific*', November, Geneva, Switzerland. (ISBN 978-971-561-861-8)
- Widdowson, D & Holloway, S 2009, 'Maritime transport security regulation: policies, probabilities and practicalities', *World Customs Journal*, vol. 3, no. 2, pp. 17-42.
- Willis, K, Homel, P & Gray, K 2006, 'Developing and implementing a performance measurement framework for drug law enforcement in Australia', Monograph Series No. 18, National Drug Law Enforcement Research Fund (NDLERF), Commonwealth of Australia, Canberra, ACT.
- Willis, K, Anderson, J & Davis, B 2010, *Implementing a drug law enforcement (DLE) performance measurement framework in Australia*, Australian Institute of Criminology, National Drug Law Enforcement Research Fund (NDLERF), Commonwealth of Australia, Canberra, ACT. (ISSN: 1449-7476)
- Willis, K, Homel, P & Anderson, J 2010, 'Developing the capacity and skills for national implementation of a drug law enforcement performance measurement framework', Monograph Series No. 34, Australian Institute of Criminology, Canberra, ACT. (ISSN: 1449-7476)
- Willis, HH, Predd, JB, David, PK & Brown, WP 2010, *Measuring the effectiveness of border security between ports-of-entry: technical report*, RAND Homeland Security and Defense Center, Santa Monica, CA. (ISBN 978-0-8330-4977-3)

- World Bank 2009, 'Doing business 2010: reforming through difficult times', The World Bank Group, Washington, DC. (DOI: 10.1596/978-0-8213-7961-5, ISSN: 1729-2638)
- World Customs Organization (WCO) 2002, '*Guide to measure the time required for the release of goods*', Brussels.
- World Customs Organization (WCO) 2007, '*WCO SAFE Framework of standards to secure and facilitate global trade*', WCO, Brussels.
- Zhang, S 2009, 'TRS as a measurement of trade facilitation: the experience of Customs in the Asia Pacific Region', *World Customs Journal*, vol. 3, no. 2, pp. 125-34.

## Endnotes

- 1 The product of the cargo handled and the period of time between when the cargo has been unloaded and the time that the same cargo leaves the port/terminal divided by the total quantity of cargo handled.
- 2 It is assumed that the business in question is based in the largest city of the economy in question and does not operate within an export processing zone or an industrial estate with special export or import privileges. It is domestically owned with no foreign ownership. The data collection is based on the business exporting a 20-foot equivalent unit (TEU) container of standardised cargo by sea transport. Every official procedure that is necessary to export the container is identified, along with the time taken in calendar days and the fees and charges in US dollars. The same is done to collect the data relating to the importation of an equivalent cargo. The costs exclude the costs of tariffs, duties and ocean transportation. The time taken and the costs exclude those incurred in the sea transport stage but they include those in the land transport stage. The cargo traded is a dry cargo. It is not hazardous, does not include any military equipment, does not require refrigeration or any other special environment, and does not involve any special phytosanitary or environmental safety standards, other than accepted international standards.
- 3 World Bank, viewed 9 September 2010, [www.worldbank.org/kz/external/default/main?pagePK=64027221&piPK=64027220&theSitePK=361869&menuPK=361907&Projectid=P070089](http://www.worldbank.org/kz/external/default/main?pagePK=64027221&piPK=64027220&theSitePK=361869&menuPK=361907&Projectid=P070089).
- 4 Total landed cost 'consists of the cost of acquisition, freight cost, customs and duties, transaction costs, other logistics costs (such as documentation), potential tax subsidies, and inventory holding costs' (Lee 2010, p. 177).
- 5 The Independent Evaluation Group (IEG) is an independent, three-part unit within the World Bank Group. IEG-World Bank is charged with, inter alia, evaluating the activities of the IBRD (The World Bank). IEG reports directly to the Bank's Board of Directors through the Director-General, Evaluation.

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