

# SUPPLY CHAIN SECURITY: ADDING TO A COMPLEX OPERATIONAL AND INSTITUTIONAL ENVIRONMENT

*Andrew Grainger*

This paper builds on research data, tables and diagrams which formed part of Andrew Grainger's (2007) PhD Thesis 'Trade Facilitation and Supply Chain Management: a case study at the interface between business and government'.

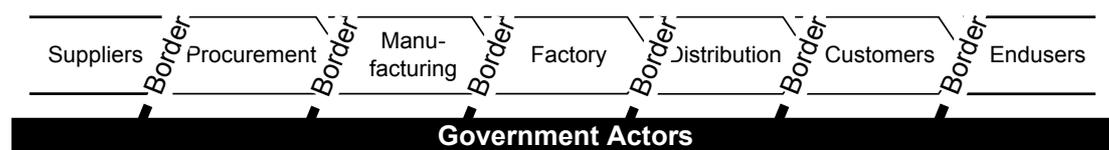
## Abstract

There has been an avalanche in new supply chain security focused controls. The aim of these controls is to seek cooperative arrangements between regulatory agencies and businesses, and to identify security risks before goods move. This paper shows the complexity of the cross-border environment, including the operational frustrations experienced by interviewed representatives at United Kingdom (UK) ports. It also maps out the institutional mechanisms between public and private sector actors shaping cross-border procedures. It is argued that current mechanisms for shaping governing rules and procedures are insufficient. Further alignment of institutions with operational requirements is required to ensure that supply chain security objectives are met.

## Introduction<sup>1</sup>

Over the last few years – especially in response to the terrorist attacks in the USA on 11 September 2001 – there has been an avalanche of supply chain security motivated control regimes. Programs include: the US-led C-TPAT (Customs-Trade Partnership Against Terrorism) and CSI programs (for example, Browning 2003); the European Union's Security Amendment to the Customs Code (648/2005/EC); the Swedish *StairSec*® program (Tullverket 2006); the Canadian Partnership in Protection program (Canada Border Service Agency 2006); the New Zealand Secure Export program (New Zealand Customs Service 2003); the Australian Frontline program (Australian Customs Service 2004); the ISO/PAS 28000 standard for supply chain security systems (Piersall & Williams 2006); the IMO's security amendment to the SOLAS convention and the newly drafted ISPS code (IMO 2002; IMO 2003); various IATA initiatives including the known shipper concept (IATA 2006); and the WCO's framework of standards to secure and facilitate global trade (WCO 2005). The aim of these supply chain security programs is to identify security risks before goods move. Underlying them is the desire by government agencies (such as customs administrations) to make efficient use of finite enforcement resources, enhance controls at the border, ensure that wealth-generating trade continues while extending controls up and down the supply chain. To meet these objectives, enforcement agencies (like Customs) aim to become an integral thread within the supply chain (Figure 1).

Figure 1. Government actors - a new thread running across the supply chain



Source: Grainger 2007

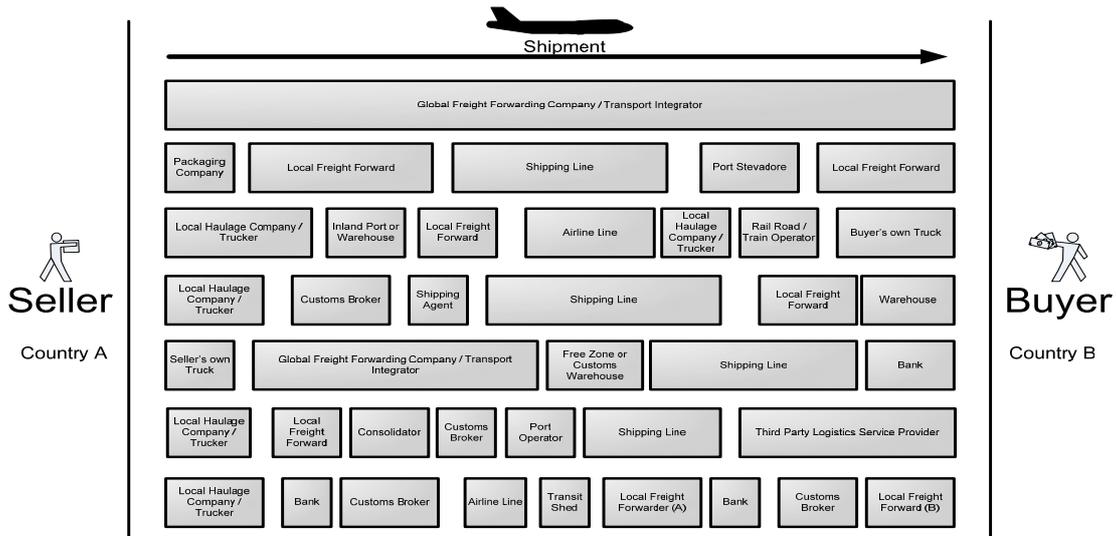
However, the supply chain is an operational arrangement that government agencies do not physically own. Effective control, as acknowledged by most supply chain security programs, is only achieved through collaboration with business actors. Any type of collaboration will normally require incentives. Sufficient incentives in supply chain security programs would need to be able to offset the additional regulatory and operational burden. Yet, the cross-border environment is littered with operational frustrations and transaction costs. This paper argues that the mechanisms for shaping governing rules and procedures are insufficient in overcoming many of the operational frustrations experienced by business and government actors in cross-border controls. Subsequently, institutional limitations in removing transaction costs reflect poorly on supply chain security programs. A closer alignment of the institutional capabilities with operational requirements is required to remedy these limitations.

### The cross-border operational system

In the majority of academic research material the cross-border environment in the international movement of goods is depicted as a line (or ocean) on the map. It is a relatively unexplored research field (Ackleson 2003; Garcia 2003). Research activity is only beginning to emerge. The cross-border environment holds many unasked and unanswered questions. Even practitioners directly involved in day-to-day cross-border operations will, due to the commercial and regulatory complexities, struggle to give a bird’s eye account of the cross-border environment. Depending on the Incoterms used, commercial and regulatory obligations can lay with the buyer (EXW), the seller (DDP) or both (any of the remaining 11 Incoterms) (ICC 1999). In most commercial relationships a wide range of intermediary and agency services will be used to enable the transaction. The form and shape of a supply chain can vary from one transaction to the next.

Typically, intermediaries include a transport operator or freight forwarder, a commercial bank, and a range of specialist agents – even where buyer and seller are part of the same organisation, for example, in instances of inter-firm trade.<sup>2</sup> Adding to this complexity, intermediaries are likely to further subcontract specific tasks to specialists. For example, a trader may use the services of a freight forwarder who will then contract the shipment to a shipping line, the customs declaration to a specialist broker, and inland transport to a separate haulage company. In Figure 2, each of the rows of boxes, describing a type of intermediary or agent service, provides illustrative examples of possible intermediary combinations in a transaction between a buyer and seller.

Figure 2. Examples of intermediary combinations in trade transactions



Source: Grainger 2007

The picture is equally complex when examining government involvement in controlling the cross-border environment. For example, the UK trade environment includes more than 60 distinct trade procedures<sup>3</sup> (Grainger 2007). These procedures may target goods, the vehicles that move them (for example, ship, plane, truck) or their operators (for example, driver, seafarer, flight crew). A summary of trade procedures is provided in Table 1 and Table 2 below. The listed procedures fall into the broader categories of revenue collection and fiscal protection, public safety and security, environment and health, consumer protection, and trade policy. Some of these regulatory activities may take place while goods are under customs controls, while others are independent of UK Customs' executive powers. The compounded complexity of commercial operations and regulatory controls sets a truly complex trade environment.

Table 1. UK Trade Procedures, Agencies and Departments

Procedures governing trade in or out of the UK	Executive Agency	Customer Focusing Body	Department with Main Policy Responsibility	Control Objective	Control Target	Procedure tied into HMRC Control
1 British Arab Certificate of Origin	British Arab Chamber of Commerce	British Arab Chamber of Commerce	Middle Eastern Governments	Trade Policy	Goods	No
2 Dangerous Goods (Air)	Civil Aviation Authority	Civil Aviation Authority	Department for Transport	Safety & Security	Goods	No
3 Import Licensing Applications	DTI Import Licensing Branch	DTI Import Licensing Branch	Dept. for Trade and Industry	Trade Policy	Goods	No
4 Movement of Waste	Environment Agency	Environment Agency	DEFRA	Environment & Health	Goods	Yes
5 Forestry Controls and Certificates (e.g. wood packaging)	Forestry Commission	Forestry Commission	Forestry Commission	Environment & Health	Goods	Yes
6 Immigration Controls (passengers)	HM Immigration	HM Immigration	Home Office	Safety & Security	Vehicle & Operator	No
7 Immigration Controls (vehicle operators)	HM Immigration	HM Immigration	Home Office	Safety & Security	Vehicle & Operator	No
8 Horticulture and Marketing Standards	Horticulture & Marketing Inspect.	Horticulture & Marketing Inspect.	DEFRA	Consumer Protection	Goods	Yes
9 Marketing Conformity	Horticulture & Marketing Inspect.	HMI (PEACH System)	DEFRA	Consumer Protection	Goods	Yes
10 ATA Carnet	HM Revenue and Customs	Chambers of Commerce	ATA Convention (DTI/HMRC)	Fiscal	Goods	Yes
11 Pet Passport	HM Revenue and Customs	DEFRA	DEFRA	Environment & Health	Goods	Yes
12 CITES Certificates (endangered species)	HM Revenue and Customs	DEFRA	DEFRA	Environment & Health	Goods	Yes
13 Ozone depleting substances - Import Licences	HM Revenue and Customs	DEFRA/European Commission	DEFRA/European Commission	Safety & Security	Goods	Yes
14 Export Controls (National Heritage)	HM Revenue and Customs	Dept. for Culture and Media	Dept. for Culture and Media	Safety & Security	Goods	Yes
15 Anti-Dumping	HM Revenue and Customs	Dept. for Trade and Industry	Dept. for Trade and Industry	Trade Policy	Goods	Yes
16 Import Licensing Controls (e.g. trade policy measures, small arms and nuclear materials)	HM Revenue and Customs	Dept. for Trade and Industry	Dept. for Trade and Industry	Trade Policy	Goods	Yes
17 Export Controls (Dual Use & Military)	HM Revenue and Customs	DTI - Export Controls Organisation	DTI - Export Controls Organisation	Safety & Security	Goods	Yes
18 Tariff Quota and Suspension Applications	HM Revenue and Customs	DTI Import Licensing Branch (+ EU Commission Databases)	DTI - European Commission	Trade Policy	Goods	No
19 Carcinogenic substances - Import Licences	HM Revenue and Customs	Health and Safety Executive	Health and Safety Executive	Safety & Security	Goods	Yes
20 Binding Tariff Informations (Applications)	HM Revenue and Customs	HM Revenue and Customs	European Commission	Fiscal	Goods	No
21 Bidding Origin Informations (Applications)	HM Revenue and Customs	HM Revenue and Customs	European Commission	Fiscal	Goods	No
22 Community Transit Procedures (NCTS)	HM Revenue and Customs	HM Revenue and Customs	HM Revenue and Customs	Fiscal	Goods	Yes
23 Excise Duties and Controls	HM Revenue and Customs	HM Revenue and Customs	HM Revenue and Customs	Fiscal	Goods	Yes
24 HMRC Export Procedures	HM Revenue and Customs	HM Revenue and Customs	HM Revenue and Customs	Fiscal	Goods	Yes
25 HMRC Import Procedures and Simplified Procedures	HM Revenue and Customs	HM Revenue and Customs	HM Revenue and Customs	Fiscal	Use	Yes
26 HMRC Procedures with Economic Impact (there are several)	HM Revenue and Customs	HM Revenue and Customs	HM Revenue and Customs	Fiscal	Use	Yes
27 Import Vat	HM Revenue and Customs	HM Revenue and Customs	HM Revenue and Customs	Fiscal	Goods	Yes
28 Red Fuel Checks	HM Revenue and Customs	HM Revenue and Customs	HM Revenue and Customs	Fiscal	Vehicle & Operator	No
29 Illegal Meat Controls	HM Revenue and Customs	HMRC/FS/DEFRA	FS/DEFRA	Environment & Health	Goods	Yes
30 Export Controls (Precursor Drugs)	HM Revenue and Customs	Home Office	Home Office	Safety & Security	Goods	Yes
31 Veterinary Medicines - Import Licences	HM Revenue and Customs	Medicines and Healthcare Products Regulatory Agency	DEFRA	Consumer Protection	Goods	Yes
32 Medical Equipment Import Licence	HM Revenue and Customs	Medicines and Healthcare Products Regulatory Agency	Medicines and Healthcare Products Regulatory Agency	Consumer Protection	Goods	Yes
33 Medicines and healthcare products Importer Licence	HM Revenue and Customs	Medicines and Healthcare Products Regulatory Agency	Medicines and Healthcare Products Regulatory Agency	Consumer Protection	Goods	Yes

Table 2. UK Trade Procedures, Agencies and Departments (continued)

	Procedures governing trade in or out of the UK	Executive Agency	Customer Focusing Body	Department with Main Policy Responsibility	Control Objective	Control Target	Procedure tied into HMRC Control
34	Kimberly Certificate (Diamonds)	HM Revenue and Customs	Overseas Issuing Bodies	Dept. for Trade and Industry	Safety & Security	Goods	Yes
35	Radio Equipment - Import Licences	HM Revenue and Customs	Radio Communications Agency	Radio Communications Agency	Consumer Protection	Goods	Yes
36	Detergents and Chemicals Product Standards	HM Revenue and Customs	Dept. for Trade and Industry	Dept. for Trade and Industry	Consumer Protection	Goods	Yes
37	EUR1 Document	HMRC (for express service; British Chambers of Commerce and Institute of Chartered Shipbrokers)	HMRC (for express service; British Chambers of Commerce and Institute of Chartered Shipbrokers)	HM Revenue and Customs	Fiscal	Goods	Yes
38	Aviation "Known Shipper"	Industry; TRANSEC	Industry; TRANSEC	Department for Transport	Safety & Security	Operator	No
39	Dangerous Goods (Rail)	Industry; TRANSEC	Industry; TRANSEC	Department for Transport	Safety & Security	Goods	No
40	Maritime "ISPS"	Industry; TRANSEC	Industry; TRANSEC	Department for Transport	Safety & Security	Operator	No
41	Maritime "SOLAS"	Industry; TRANSEC	Industry; TRANSEC	Department for Transport	Safety & Security	Operator	No
42	Certificate of Free Sale	many, depending on product	many, depending on product	many, depending on product	Consumer Protection	Goods	Yes
43	Dangerous Goods (Sea)	Maritime Coast Guard Agency	Maritime Coast Guard Agency	Department for Transport	Safety & Security	Goods	No
44	Organic Certificate	Port Health Authority	DEFRA	DEFRA	Consumer Protection	Goods	Yes
45	Veterinary Controls	Port Health Authority	DEFRA	DEFRA	Environment & Health	Goods	Yes
46	TRACES (Live animals and products of animal origin)	Port Health Authority	DEFRA - EU Commission	DEFRA / European Commission	Environment & Health	Goods	Yes
47	Labelling (Food)	Port Health Authority	Food Standards Agency	Food Standards Agency	Consumer Protection	Goods	Yes
48	Plant Health Certificates	Plant Health Inspectorate	Plant Health Inspectorate	DEFRA	Environment & Health	Goods	Yes
49	Phytosanitary Export Certificates	Plant Health Inspectorate	Plant Health Inspectorate	DEFRA	Environment & Health	Goods	No
50	Ship's Waste	Port Authority	Port Authority	Department for Transport	Environment & Health	Vehicle & Operator	No
51	Gosstandard (Russian Product Standards)	Private Testing Companies in the UK	Private Testing Companies in the UK	Russian Customs	Safety & Security	Goods	No
52	Border Inspection Posts	Private UK companies (usually port stevedores)	Private UK companies (usually port stevedores)	DEFRA / European Commission	Environment & Health	Goods	No
53	Pre-shipment Inspections	PSI Companies	PSI Companies	Third Country Governments	Fiscal	Goods	No
54	TIR Carnet	Road Haulage Association and Freight Transport Association	Road Haulage Association and Freight Transport Association	International Road Union	Fiscal	Vehicle & Operator	Yes
55	CAP Refunds	Rural Payment Agency	Rural Payment Agency	DEFRA	Fiscal	Goods	Yes
56	Fishery Controls	Sea Fisheries Inspectorate	Sea Fisheries Inspectorate	DEFRA	Environment & Health	Goods	Yes
57	Veterinary Export Certificates	State Veterinary Service	State Veterinary Service	DEFRA	Environment & Health	Goods	Yes
58	Port Community Systems	There are five UK providers	Community System Providers	Business, but HMRC is a major stakeholder	Fiscal	Goods	Yes
59	Labelling (Products)	Trading Standards	Trading Standards	Dept. for Trade and Industry	Consumer Protection	Goods	Yes
60	Bio Terrorism Controls for US	US Food and Drug Administration	US Food and Drug Administration	US Food and Drug Administration	Safety & Security	Goods	No
61	Container Security (CSI)	US Customs	US Dept for Homeland Security	US Dept for Homeland Security	Safety & Security	Goods	Yes
62	Dangerous Goods (Road)	Vehicle Operator Service Agency; Police	Vehicle Operator Service Agency; Police	Department for Transport	Safety & Security	Goods	No
63	Road Vehicle and Weight Checks	Vehicle Operator Service Agency; Police	Vehicle Operator Service Agency; Police	Department for Transport	Safety & Security	Vehicle & Operator	No

Source: Grainger 2007

## Operational frustrations at UK ports

In today's supply chains, the management objectives focus on the creation value and the reduction of costs (Christopher 1992). Any wasteful transaction costs will ultimately place businesses at a competitive disadvantage (Porter 1998). It should not be a surprise that those practitioners involved in ensuring the movement of goods up and down the supply chain are particularly sensitive to transaction costs. Between 2002 and 2004 several UK ports (Britain's borders) were visited and 41 representative actors from business and government organisations were interviewed. These very detailed interview sessions yielded a collection of 223 comments on concerns and perceptions. While all interview respondents were able to give details on electronic port and customs systems that over the last two decades have helped to significantly reduce transaction costs, interview respondents also described the UK's cross-border environment as a complex system where operational frustrations and subsequent transaction costs prevail (Grainger 2007).

Business and government actors who were interviewed, addressed topics of behaviour, technology, performance of government, capabilities, trade procedures, cooperation between and amongst actors, the performance of business, and uncertainty. Respondents were able to give illustrative examples of operational frustrations and subsequent transaction costs for each of these topical areas. Underlying many of the described frustrations was the perception that regulatory controls are not always compatible with operational needs. This can give rise to wasteful transaction costs and inefficiency. The following paragraphs highlight some of the concerns described where operations amongst actors have been frustrated because of failing rules and regulations.

All interviewed traders, for example, reported instances where customs and veterinary controls are enforced to different levels or in different ways, depending on the port and the officers on the ground. Subsequently, some interviewed parties gave accounts of where traffic had been actively diverted to an alternative port. This practice was also confirmed in a later survey of UK importers<sup>4</sup> in which 19% (N=131) of respondents admitted to actively diverting traffic cargo to an alternative port because of actual or perceived differences in the enforcement of rules and procedures (Grainger 2007).

Similar concerns about rules and regulations were also shared by some of the government inspectors. For example, a port health officer complained that he had to regularly check consignments of tinned tuna from a reputable food importer because of legislatively set inspection quotas – even though, from his point of view, the public-health risk was negligible when compared to other food categories or types of traffic. Traders and government inspectors also reported instances where official controls were uncoordinated, for example, a veterinary inspection that was followed by a customs inspection and vice versa.

Another example of operational frustrations given by interview respondents was that procedures and systems do not always align. For example, while most UK customs declarations can be submitted and processed electronically, the vast majority of non-customs procedures still rely on paper documents. Subsequently, many paper documents need to be laboriously matched to entries in electronic systems – especially in instances where non-customs procedures take place while under customs control and Customs needs to verify that the other government department has met its control obligations.

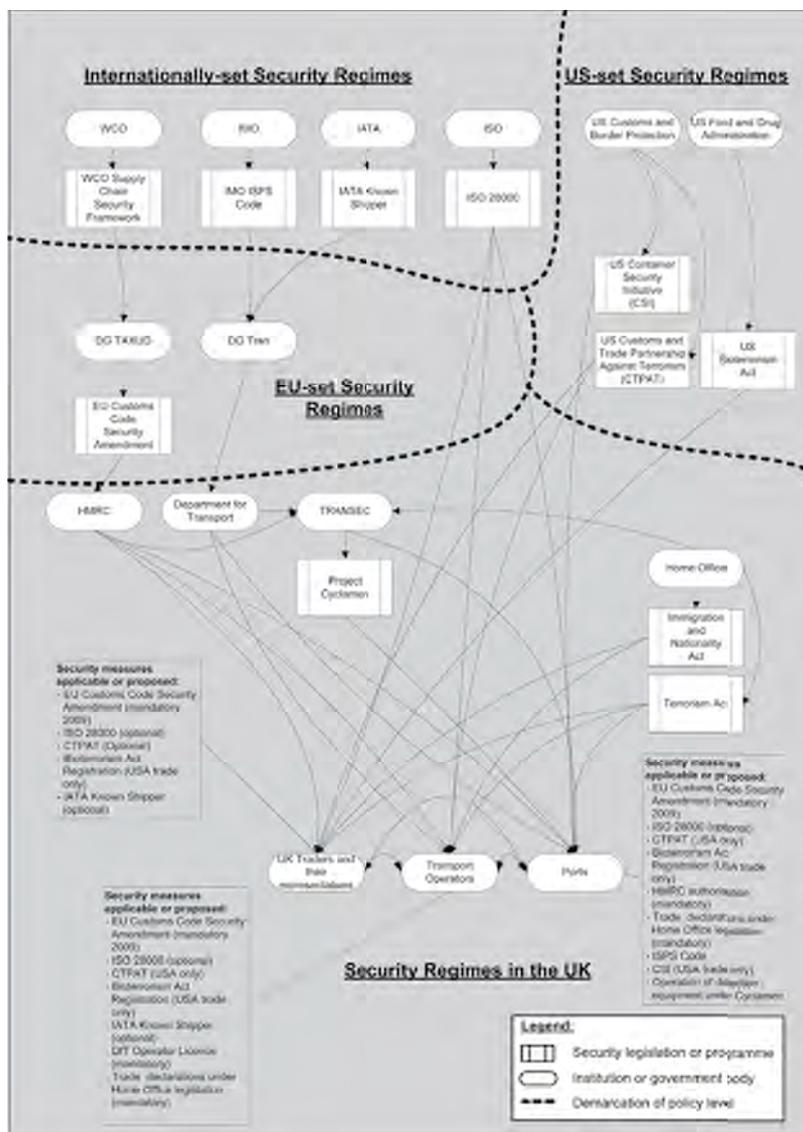
To give one further example, a problematic area cited by a port health officer was the use of seals. The officer is often bound by regulation to take samples of goods and submit these to laboratories for further analysis. However, to open the consignment this officer not only breaks the veterinary seal, but must also break any other seals (such as a customs seal) that prevent a sample being taken, which can have immediate fiscal consequences for the trader.

There are many more examples (Grainger 2007), but those cited above give some indications of what the collection of concerns and perceptions through an interview series can reveal.

## Adding supply chain security to the equation

So far, this paper has described a very complex commercial and regulatory environment with many actors. As evidenced through research at UK ports, transaction costs amongst actors occur – especially where regulations and operational practices do not align. With the addition of supply chain security measures a further burden is placed on trade compliance and on regulatory enforcement. These new security regimes have been developed by a range of institutions that have an interest in the control of goods, vehicles and people. Subsequently, in the UK, one can find a multiple of overlapping security regimes. Each one of them places additional requirements on traders and their intermediaries. The illustration of overlapping transport (IMO, IATA), business standards (ISO) and customs control regimes is reminiscent of a spaghetti bowl (Figure 3). In the UK example, it includes international, regional (EU), third country (for example, USA) and national policy levels.

Figure 3. Security spaghetti

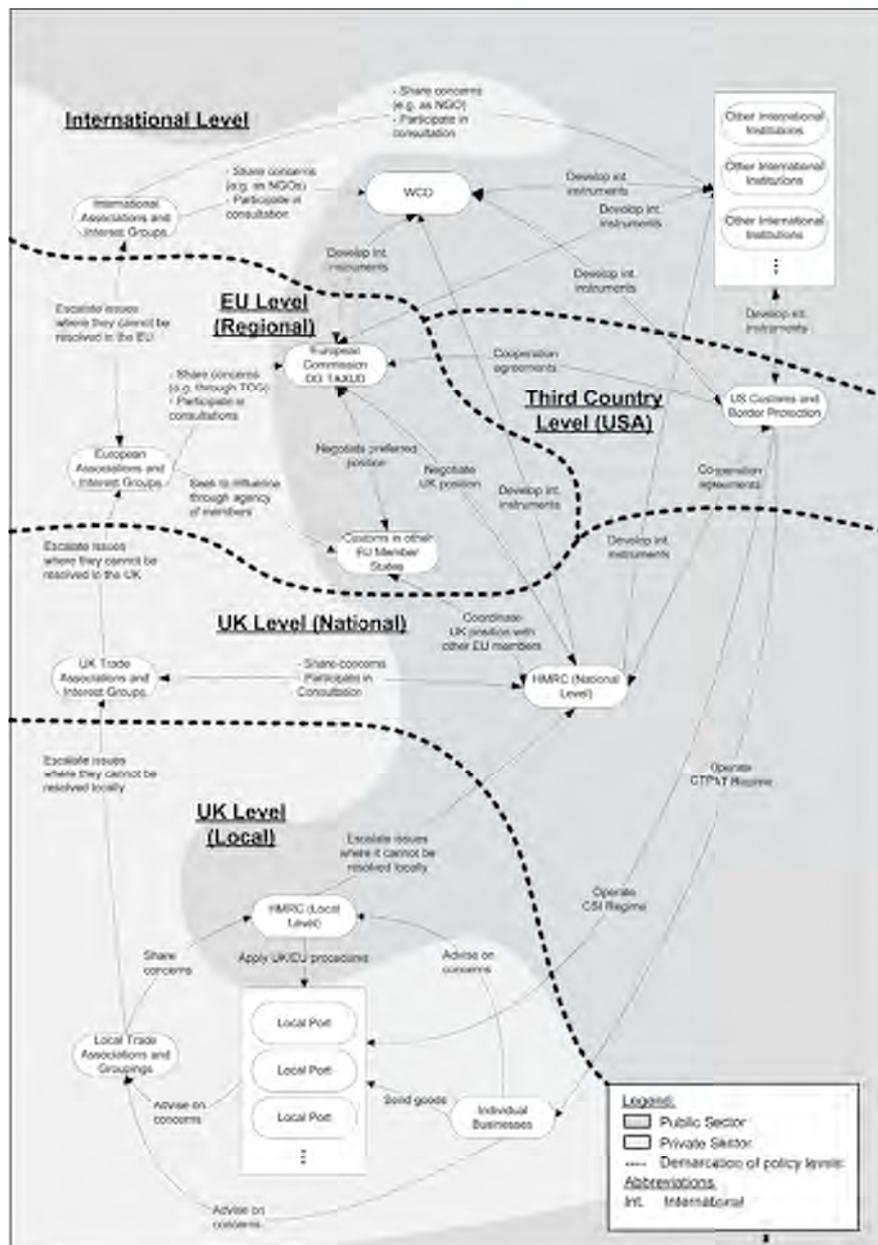


Source: Grainger 2007

## International Network of Customs Universities

If one considers the resulting and remaining frustrations at UK ports, there are few avenues for traders and enforcement officers to feed their day-to-day experiences directly into the legislatively defined controls and procedures. Feedback normally takes place through the agency of trade associations and the policy executives of national administrations. Figure 4 maps out some of the paths that are available to public and private sector actors. Where operational problems in the application of customs procedures cannot be resolved at the port level, they inevitably need to be escalated to that level where policy is set. As most customs and trade procedures are international in nature, this means an escalation of issues to national, regional, international and bilateral policy levels.

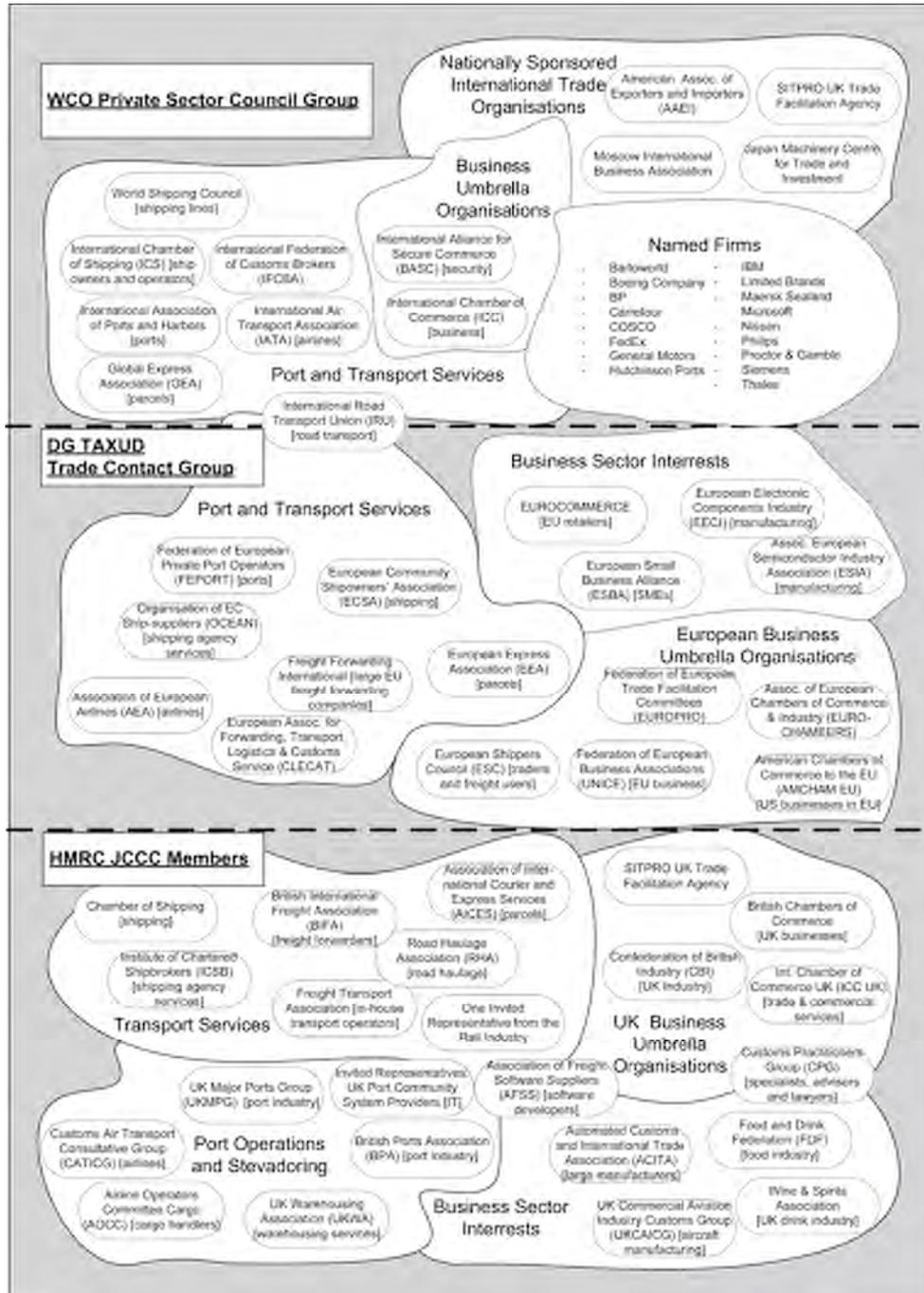
Figure 4. Relationship spaghetti



Source: Grainger 2007

Private sector interests, through the agency of trade associations and interest groups, tend to be organised accordingly. For example, Figure 5 maps out those business interests active in UK Customs' (HMRC) consultative committee (the JCCC), the European associations active in the Commission's Trade Contact Group, and those groups active in the WCO's private sector council (Grainger 2007).

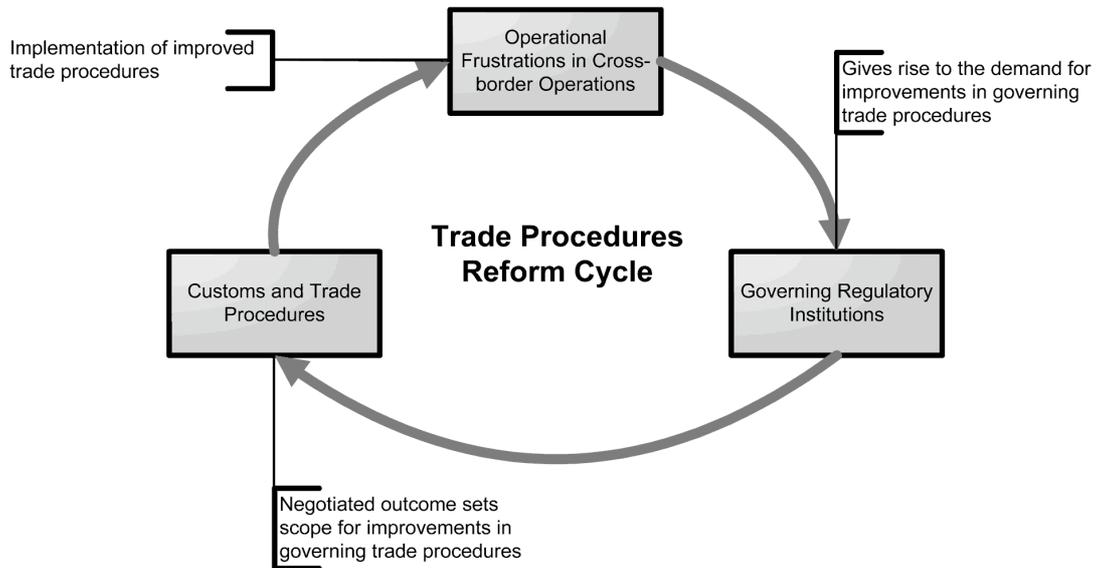
Figure 5. Trade association spaghetti



Source: Grainger 2007

In the previously described arrangements, trade procedures are set by regulatory institutions, which usually (at least in the UK) includes consultation with representatives from various interests' associations. When new regimes – like those covering the area of supply chain security – are implemented, the operational frustrations experienced (or anticipated) by traders and enforcement officers may give rise to sufficient lobbying that instigates reform (Figure 6). However, this feedback cycle is slow and it usually takes many years to effect change whereas business operations in a competitive world tend to be very fickle. As outlined earlier, the shape and form of a supply chain can vary from one transaction to the next. The institutional arrangements that are currently maintained by business and government actors appear to be out of step when compared to the responsiveness and agility that is so often prevalent in day-to-day supply chain management operations.

*Figure 6. Trade Procedures Reform Cycle*



*Source: Grainger 2007*

## **Institutional challenges**

The challenge in reducing transaction costs and meeting regulatory control objectives – like those of increased security – is to consider how best to align the institutional framework with operational requirements. For government agencies, as set out earlier, it is to make efficient use of finite enforcement resources, enhance controls at the border, extend controls up and down the supply chain, and to ensure that trade continues. For businesses, the management objective in supply chain management is about reducing costs and increasing value.

In light of the current environmental complexity and institutional overlap, neither the business supply chain objectives nor the regulatory control objectives are likely to be served. Government controls and their institutions appear visibly out of step with the practices of modern day supply chain management. Any meaningful incentives by regulators to offset additional burden appear to be thin. The subsequent challenge is one of realigning a complex arrangement of regulatory institutions to fit the needs of stakeholders. In an international business environment this inevitably includes the full cross-section of traders and their intermediaries.

However, as was explained earlier, commercial arrangements in international trade operations can be complex. Power amongst stakeholders in the cross-border environment is not equally distributed. For

example, interviewed port users reported that larger shipping lines, stevedores, and those regulatory agencies that offset inspection costs against fee income (for example, Port Health Authorities) are able to pass on cost burdens to their customers with relative ease. By contrast, many of the interviewed freight forwarders described a very competitive business environment where any additional costs hit their own margins first. Subsequently, business interests are not always aligned. Quite often they are conflicting or opposing – especially where it gives rise to market positioning strategies (Mintzberg 1990).

Moreover, in the current institutional set-up, some types of business interests may be under-represented or not represented at all (Figure 5). For instance, research by Verwaal and Donkers (2002; 2003) and Grainger (2007) suggests that economies of scale apply to cross-border operations. Traders and operators with larger operations are able to offset the predominantly fixed costs associated with regulatory compliance over larger volumes of trade. This means that those traders with smaller volumes are more likely to rely on the services of intermediaries and be less inclined to invest in developing their own compliance capabilities. However, as regulatory institutions are overhauled, changed or amended – like through the introduction of supply chain security regimes – the economics change, too. This gives rise to new actors and may make other actors redundant or less relevant. While this gives cause for concern (and resistance) amongst some interest groups, it also gives rise to innovation, scope for transaction cost reductions and better utilisation of resources.

An obvious approach to finding alignment between government and business interest is to apply trade facilitation principles. These are the simplification, standardisation, harmonisation and modernisation of trade procedures. The trade facilitation program is nothing new, and many customs administrations already subscribe to some of its prescriptions (UN/CEFACT and UNCTAD 2002). However, many procedures take place outside of customs control (see Tables 1 and 2). Subsequently, trade facilitation programs such as the Single Window (UN/CEFACT 2004) do appear to offer a particularly enticing solution to meeting both business and government control objectives in supply chain security.

### **Points to consider in supply chain security**

This paper leaves a number of points to consider. These have research and policy implications. Much of the cross-border environment and its operational and institutional complexity remains little understood. Subsequently, there are many actors and many underlying interests which add to the environment's complexity. As the precedent of the Authorised Economic Operator (AEO) concept suggests, one can witness a process of rapprochement between executive agencies and business. However, much of the focus is still on submitting declarations and complying with procedures. Moreover, many of the frustrations currently experienced at the border (ports) are likely to be further compounded by the addition of supply chain security measures – especially when one considers the overlap resulting from all the security spaghetti. Alternative approaches may involve greater emphasis on the definition of objectives, leaving individual businesses the freedom to consider how they wish to meet these objectives. However, such an approach would require different types of organisational capabilities than those currently displayed by the many regulatory agencies at the border. It is also likely to call for a greater effort towards the simplification, harmonisation and modernisation of trade procedures – the core principles of trade facilitation (WTO 1998).

This gives rise to a research and policy agenda that considers the operational and institutional framework in the current cross-border environment as well as the consideration and evaluation of the various interests (political, institutional, commercial and industrial) at work. In this context, unexplored research areas include: the operational interface between business and government; the institutional and regulatory overlap in the control of goods (akin to Tables 1 and 2 and Figure 3); the development of a regulatory framework that is aligned to modern day supply chain management practices; the negotiation process between public and private sector actors in defining trade procedures (akin to Figures 4 and 6); the interests of actors and the implementation of trade facilitation concepts (for example, by building on Figure 5); and, human and organisational capabilities necessary to enable closer cooperation between business and government actors in supply chain security.

## References

648/2005/EC. Regulation (EC) No 648/2005 of the European Parliament and of the Council of 13 April 2005 amending Council Regulation (EEC) No 2913/92 establishing the Community Customs Code [OJ. 2005 No. L117/13].

Ackleson, J 2003, 'Directions in border security research', *Social Science Journal*, vol. 40, no. 4, pp. 573-581.

Australian Customs Service 2004, *Frontline*, viewed 3 August 2006, <http://www.customs.gov.au/SITE/page.cfm?u=4237>.

Browning, D 2003, 'Trade facilitation policy and new security initiatives', in UNECE (Ed.) *Sharing the gains of globalization in the new security environment*, UN Geneva, pp. 169-178.

Canada Border Service Agency 2006, *Partners in protection*, viewed 3 August 2006, <http://www.cbsa-asfc.gc.ca/general/enforcement/partners/menu-e.html>.

Christopher, M 1992, *Logistics and supply chain management: strategies for reducing costs and improving services*, Pitman, London.

Dicken, P 2003, *Global shift: reshaping the global economic map in the 21st century*, Sage Publications, London.

Garcia, J 2003, 'Directions in border research: an overview', *Social Science Journal*, vol. 40, no. 4, pp. 523-533.

Grainger, A 2007, 'Trade facilitation and supply chain management: a case study at the interface between business and government', PhD thesis, Birkbeck College, University of London, 448 pages.

IATA 2006, *Security issues*, viewed 3 August 2006, [http://www.iata.org/whatwedo/security\\_issues/index.htm](http://www.iata.org/whatwedo/security_issues/index.htm).

ICC 1999, *Incoterms 2000: ICC Official Rules for the Interpretation of Trade Terms*, International Chamber of Commerce, Paris.

IMO 2002, *Amendments to the SOLAS (Safety of Life at Sea) Convention – Measures to Enhance Maritime Security*, International Maritime Organisation, London.

IMO 2003, *ISPS (The International Ship and Port Facility Security) Code, 2003 Edition*, International Maritime Organisation, London.

Mintzberg, H 1990, 'Strategy formation: schools of thought', in JW Fredrickson (ed.), *Perspectives on strategic management*, Harper Business, New York, pp. 105-237.

New Zealand Customs Service 2003, *New rules for exports: frequently asked questions*, viewed 3 August 2006, <http://www.customs.govt.nz/nr/rdonlyres/b94047b8-41a7-4448-9ea3-e8f8d6acbcff/0/secureexportsdocforweb4.pdf>.

Organisation for Economic Co-operation and Development (OECD) 2002, *Economic outlook – intra-industry and intra-firm trade and the internationalisation of production*, Organisation for Economic Co-operation and Development, pp. 159-170.

Pain, N 2005, *Networks, multinational firms and UK export performance*, National Institute of Economic and Social Research, viewed 3 August 2006, <http://www.esrcsocietytoday.ac.uk>, pp. 1-11.

Piersall, C & Williams, N 2006, 'ISO/PAS 28000 Applies management systems to security of global supply chains', *ISO Insider*, pp. 18-21.

Porter, ME 1998, *Competitive advantage: creating and sustaining superior performance*, Free Press, New York/London.

- Tullverket 2006, *The StairSec®*, viewed 3 August 2006, [http://www.tullverket.se/en/Business/the\\_stairsec/](http://www.tullverket.se/en/Business/the_stairsec/).
- UN/CEFACT 2004, *Recommendation No. 33: Single Window Recommendation*, CEFACT, UN, Geneva.
- UN/CEFACT & UNCTAD 2002, *Compendium of Trade Facilitation Recommendations*, UN/CEFACT, United Nations, Geneva.
- Verwaal, E & Donkers, B 2002, 'Firm size and export intensity: solving an empirical puzzle', *Journal of International Business Studies*, vol. 33, no. 3, pp. 603-613.
- Verwaal, E & Donkers, B 2003, 'Customs-related transaction costs, firm size and international trade intensity', *Small Business Economics*, vol. 21, no. 3, pp. 257-271.
- WCO 1999, *Revised Kyoto Convention: International Convention on the Simplification and Harmonization of Customs Procedures*, World Customs Organization, Brussels.
- WCO 2005, *Framework of standards to secure and facilitate global trade*, World Customs Organization, Brussels.
- WTO 1998, *WTO: a training package: what is trade facilitation?*, viewed 2 August 2006, [http://www.wto.org/english/thewto\\_e/whatis\\_e/eol/e/wto02/wto2\\_69.htm#note2](http://www.wto.org/english/thewto_e/whatis_e/eol/e/wto02/wto2_69.htm#note2).

## Endnotes

- 1 A helpful list of frequently used acronyms in international trade and customs procedures, including those in this paper, can be viewed at <http://www.tradefacilitation.co.uk/content/view/30/44/>
- 2 Peter Dicken (2003, p. 53) suggests that the 'ball park' figure for inter-firm trade lies at around 1/3 of world trade. Unfortunately, aggregated data, with the exception of Japan and the USA, is still very rare (OECD 2002). UK specific research has found that nearly one-half of all merchandise exports to the USA (the UK's single largest export market) are by UK based US owned affiliate companies and by UK parent companies to their US affiliates (Pain 2005).
- 3 Most procedures that were listed have multiple components. For example, they often include pre-notifications and full declarations. Similarly, Customs import and export procedures often include a number of additional control measures (for example, see WCO 1999). If these are considered, the number of listed procedures can be significantly inflated.
- 4 This Web-survey was conducted by Andrew Grainger as part of his PhD thesis (Grainger 2007). It was hosted on the SITPRO website in autumn 2004. Publicity for the survey was raised by the Chartered Institute for Logistics and Transport, the British International Freight Associations and SITPRO policy groups.

### Dr Andrew Grainger



Dr Andrew Grainger is the founding director of Trade Facilitation Consulting Ltd. Andrew holds a PhD from Birkbeck College, University of London where he submitted his thesis on trade facilitation and supply chain management. Prior to setting up his own firm Andrew worked for SITPRO, the UK Trade Facilitation Agency. Other experiences include consultancy with PricewaterhouseCoopers and freight forwarding in Germany and Southeast Asia. He can be contacted by email at: [grainger@tradefacilitation.co.uk](mailto:grainger@tradefacilitation.co.uk).

