

Analysis of current customs practices in the United States and a proposed model for world class Customs

Tom Coyle, Kevin Cruthirds, Sara Naranjo and Katharina Nobel

Abstract

The purpose of this research is to propose a theoretically supported model for world class customs procedures and present testable propositions. A gap is noted in customs research and literature: no attempt has been made to bring together in one model the significant constructs which define world class customs operations. The model proposed in this paper is based upon literature and indicates six constructs to world class customs: infrastructure, procedures, technology, time focus, cost, and mission. The proposed model is contrasted with current practices used by US Customs and Border Protection (CBP). Also discussed are constructs for further research in this field of study. This topic is critically important in today's global environment because any disruption to the supply chain can be costly and waste significant resources of a firm or country.

1. Introduction

The purpose of borders is to delineate sovereignty and legal control (Bersin 2012), essentially allowing communities of people divided into nations to function while maintaining control over their own territory. Having defined the border, the next step for countries is to determine how to control the border. This decision has historically been driven by the primary focus of the country. The control mechanism has fallen generally into four broad categories: control of physical boundaries from invading armies; control of population migration; the collection of duties on international goods entering their country; and control of goods leaving and entering the country (Widdowson 2007; Koslowski 2011).

The practice of stopping goods at a territorial border to collect duties dates back to Syria, 136 AD (Asakura 2003). However well this centuries old practice has served countries throughout the ages, this paper argues that current customs practices, outdated in the age of globalisation and information technology (Stevenson 2011), may be hampering global trade and adding cost. This broad concept is the focus of this research.

The need to update customs practices has been documented in the literature. In 2002, the World Trade Organization (WTO) investigated the impact of current customs practices and identified possible impediments to global trade (WTO 1998):

- Excessive government documentation requirements
- Lack of automation and insignificant use of information technology
- Lack of transparency; unclear and unspecified import and export requirements
- Inadequate customs procedures, particularly audit-based controls and risk-assessment techniques
- Lack of cooperation and modernisation amongst Customs and other government agencies, which impedes efforts to deal effectively with increased trade flows.

The list of problems noted by the WTO stems from the focus on customs duties. While the traditional core role of Customs has been the control of goods flowing across national borders, some countries' priorities have shifted traditional core customs responsibilities to different governmental agencies. For example, in Hong Kong, due to its free port status, the focus of classification and valuation is assigned to the Census and Statistics Department rather than the Customs and Excise Department (Widdowson 2007). The United States (US) Customs and Border Protection (CBP) service is another whose focus has changed in more recent years.

CBP has a long and successful tradition of regulating the flow of goods into and out of the US and is a part of the Treasury Department. However, after 9/11 the focus of US Customs changed from goods flow to border security (CBP 2009). This changing focus for US Customs has not been without consequences nor has it gone unnoticed. There has been a growing call for CBP to improve service and reduce crossing times (Accenture Consulting Group 2008). The reason for this is simple economics: the US is in its worst economic slowdown in over thirty years (Pethokoukis 2012). Also, the US is the world's largest economy (World Bank 2012a), and any slowdown in the US economy will have an impact upon the rest of the global economy. The necessity to improve customs' operations, both in the US and worldwide, is important because ports of entry are an integral part of the worldwide supply chain.

Much of the customs-related literature has focused on individual issues. Some research has been done on best practices but there has been no comprehensive approach to theoretically developing a model of world class customs. It is the intent of this research to fill this gap. This paper first presents a literature review intended to determine best practices in customs operations, define current practices, and provide a basis for model development. The next section proposes a theoretical model for world class customs operations and then offers propositions that can be developed into testable hypotheses. The last section summarises the findings and provides recommendations for further research.

2. Literature review

2.1 Best practices

Several authors and agencies have attempted to define modern customs organisations in terms of those using or implementing best practices. One such example is reported by Gwardzińska (2012) who notes the initiation of the Authorised Economic Operator (AEO) status program within the European Union (EU). The AEO program starts with a common database of information and is designed to ensure those economic operators have achieved a status that minimises risk with regard to importing and exporting goods. This successful program has been extended to economic operators in Sweden, Norway and Japan. Currently, negotiations are under way with China, the US and South Africa (Gwardzińska 2012). In addition to AEO status, electronic communication for numerous import and export procedures is being implemented and standardised within the EU with a target implementation date of 2015 (Gwardzińska 2012).

The International Air Cargo Association (tiaca.org) has identified best practices which are deemed critical for expedited customs treatment of air cargo shipments. As a general matter, customs authorities should have the capacity for the following:

1. Providing online information about customs practices, including regulations
2. Providing binding advance rulings
3. Providing independent, administrative reviews/appeals
4. Overall transparency
5. Overall integrity
6. Progressive modernisation

7. Automation/paperless environment
8. Evaluation of data and enforcement actions based on risk assessments
9. Formal consultations with the trading community for new rules and procedures
10. Permitting post-release reconciliation and post-entry audits
11. Penalty mitigation through a transparent, well documented process
12. Separation of physical release from fiscal release.

2.2 Ease of Doing Business Index

The World Bank has ranked countries for which it can collect data with regard to their abilities for private sector firms to do business, either within the country or with firms operating within the borders of the country. In the Ease of Doing Business Index, the US has traditionally been ranked in the top three countries out of the 189 reported. However, for 2013, the US dropped to the number four position and is in danger of dropping even further. The World Bank uses ten variables in order to rank a country's ease of doing business, as compared to the other countries it monitors. The ten variables used in the index are shown in Table 1.

Table 1: Variables used in determining the Ease of Doing Business Index

Starting a business	Protecting investors
Dealing with construction permits	Paying taxes
Getting electricity	Trading across borders
Registering property	Enforcing contracts
Getting credit	Resolving insolvency

Source: World Bank 'Ease of Doing Business Index' 2013.

Note that one of the variables used in the ranking is trading across borders. The data used to compile the rankings was done via surveying both the private and governmental sectors' subject matter experts. The areas of the survey that make up the trading across borders construct are shown in Table 2.

Table 2: Variables used in determining the trading across borders construct

Legal reforms	Inland transportation
Document filing	Customs clearing and inspection
Port and terminal handling	Costs

Source: World Bank 'Ease of Doing Business Index' 2013.

The review has shown that best practices and current practices have identified several issues that have an impact on customs practices and procedures. Literature supports summarising the best practice items into six constructs: infrastructure, procedures, technology, time focus, cost and mission. The next section expands on these constructs and proposes propositions for future evaluation.

3. Model development and propositions

3.1 Infrastructure

Infrastructure is a basic requirement for economic development (Fasoranti 2012; Waters 1999). This statement has not been disputed regarding overall economic development for a country. China experienced a resurgence in its economy in 2011, which resulted in a USD4.6 billion expansion and modernisation program for ports (Industry Trends 2011). While infrastructure logically impacts less developed countries, there are issues in this arena even in industrialised western countries.

International terrorism has brought a new sense of urgency to ports of entry in the security arena. Consider the two opposing issues. First, global trade functions best when the concepts of efficiency and effectiveness are applied to the movement of goods (Stevenson 2011). Simply put, global trade works best when barriers in the supply chain are minimised or eliminated. Second, the current significant impediment to global trade is international terrorism which has added a significant risk for many countries, and for some, the risk is considerable. As a result of international terrorism, the ability of ports in the US to maintain pace with global trade has been minimal at best (Accenture Consulting Group 2008). Even with the minimal ability to maintain pace with global trade, the US's ports of entry are not designed to accommodate the volume of trade with the current security measures in place (Siekman 2003).

Consider, for example, the current situation with commercial truck traffic moving among Canada, the US and Mexico. One of the anticipated benefits from trade agreements is increased trade. In the case of North America, consider that trade between the North American Free Trade Association (NAFTA) signatories tripled from USD297 billion in 1993 to USD1.6 trillion in 2009 (Burfisher, Robinson & Thierfelder 2004). This represents a 438% increase in the dollar value of trade among the NAFTA partners. Accompanying this dollar value is an increase of truck traffic along both borders. In 1995, the first year of NAFTA, 7.99 million trucks (empty and loaded) crossed the US borders from both Mexico and Canada. By 2010, this number had increased to 10.1 million (Research and Innovative Technology Administration [RITA] n.d.), a 26.4% increase in truck traffic.

The Accenture Consulting Group (Accenture) conducted a study for the US Department of Commerce and in a 2008 report noted the following:

- US-Mexico trade totals approximately USD340 billion annually
- Every day more than 13,000 trucks bring over USD550 million of product into the US
- US exports to Mexico total USD136 billion, with USD93 billion crossing via commercial trucks. This represents a 150% increase in export value since the enactment of NAFTA (Accenture Consulting Group 2008).

While the above statistics are encouraging signs showing the benefit of NAFTA, this growth points to an obvious problem: truck congestion. The increase in truck traffic at the nations' land ports represents two problems: (1) the increased number of trucks makes inspecting and detecting both illicit cargo and national security threats more difficult, and (2) the increased time for legal trucks to cross the borders is costly and has a direct effect on the cost of NAFTA firms' abilities to compete in a global environment. The Accenture study (2008) concluded the following:

- In 2008, the wait times at the five busiest bridges on the southern border averaged one hour.
- In 2008, border delays cost the USD116 million per minute and 26,000 jobs and USD6 billion in output, USD1.4 billion in wages, and USD600 million in tax revenue annually.
- By 2017, the above numbers are expected to double.
- US goods and services trade with NAFTA totalled USD1.6 trillion in 2009 (latest data available for goods and services trade combined).

The above is presented to show the magnitude of trade among the US, Canada and Mexico. As global trade increases, the pressure on the US ports of entry will only intensify.

The Accenture report (2008) also identified a number of problems which, if not solved, will have a significantly adverse impact on NAFTA economies. These border delays result in losses to output, wages, jobs, and tax revenue due to various decreases in spending.

1. Companies, suppliers, and consumers due to congestion, delays, and wait time uncertainty.
2. US and Mexican firms require increased inventory levels, additional trucks, and additional drivers.
3. US and Mexican exporters experience higher transportation costs and less export volume.

4. US consumers pay higher prices for Mexican goods and reduced consumer choice.
5. The productivity of firms is compromised, especially in time-sensitive industries (for example, automotive, agriculture).
6. The border region's ability to attract and maintain investments is hindered.

The above discussion points to the need for improvement in the ability of the US port of entry operations. This includes not only infrastructure but all aspects of import and export operations: data, forms and records, ability to resolve problems and time to cross. This leads to the first proposition which is:

P1: The ability to adequately and quickly move goods through ports of entry is positively related to trade.

3.2 Procedures

The ability for organisations to function effectively has long been linked to effective policies and procedures (Daft 2006). Administratively, procedures are designed to cover recurring situations and provide repetitive steps which minimise managerial intervention. One drawback to procedures is that they can take on a life within themselves; in other words, procedure is followed, not because it is the best thing to do, but because it is what has always been done. From an organisational behaviour perspective, this phenomenon is called structural inertia (Miller & Friesen 1980; Hannan & Freeman 1984; Jansen 2004). Essentially, structural inertia occurs when organisations build in mechanisms to provide stability. These mechanisms include hiring procedures and formalised regulations and policies which provide stability to the organisation. When change is attempted to be introduced into the organisations, these structural inertia mechanisms act to counterbalance or minimise the change.

One mechanism to improve organisational effectiveness is education. Interestingly, the US CBP has a considerable training budget for law enforcement-related training but it has not invested the resources to develop supervisors and managers to effectively plan and guide their organisation into the 21st century (Coyle 2011). The lack of managerial education and training will hinder any organisation.

Effective procedures are the strategic link between vision and operations. In terms of customs operations, a series of measures can be turned into programs, policies and results that will benefit both security and economic competitiveness (Mongelluzzo 2011). Also, the free flow of goods will be enhanced by improvements to procedures and technology, thus increasing the speed at which goods may be cleared at intra-regional borders (Preece 2012). There is also a need to review existing procedures in order to ensure compliance with international conventions (including the WCO Revised Kyoto Convention) and international best practice ('Customs in the 21st Century') (WCO 1999; 2008).

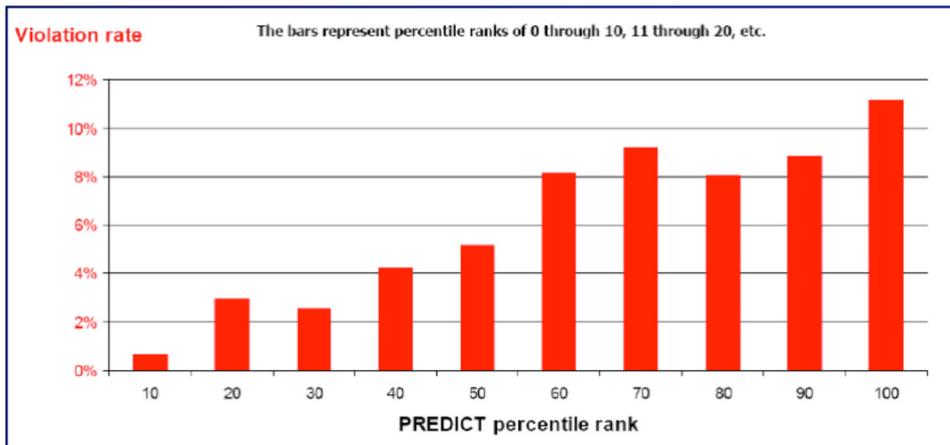
While this research has used US CBP as an example to support the need for the development of a world class customs model, this does not imply that other customs organisations do not need a model. For example, Doyle (2012) has issued a call to rethink the procurement practices of many customs organisations. Doyle's findings note that most customs organisations have very lengthy time requirements to complete a purchase which in many cases renders high-level technology as out of date by the time the equipment is installed. Also, and arguably the most serious allegation, is many customs organisations have a clear purchasing intent but no strategic intent (Doyle 2012).

One area affecting procedure in port of entry operations within US CBP is structural inertia, particularly in the examination of goods at ports of entry. The current method for CBP in the US is to examine every single vehicle that enters the US, causing tremendous delays and increased cost. These problems should prompt a change in procedure, but none has been forthcoming.

However, the Food and Drug Administration (FDA), faced with a similar situation, developed a computer-based algorithmic system called PREDICT, which is a tool used for screening imports and exports. This program was designed and is operated for the FDA in conjunction with New Mexico State

University. PREDICT (Predictive Risk-based Evaluation for Dynamic Import Compliance Targeting), was instituted as a scientific alternative to the previous method of inspecting relevant shipments. The FDA previously relied on entry document review and inspector intuition to make decisions (Silver 2011). The fundamental improvement has been to incorporate the latest technology to quickly separate potential violators or high risk shipments from non-violators or low risk shipments. This was accomplished by developing algorithmically-driven software that uses relevant variables and assigns a score to each shipment. The results have been impressive as shown in Figure 1.

Figure 1: FDA violation rate data using PREDICT



Source: Silver 2011.

The data in Figure 1 was taken from 81,480 field and label examinations for entries submitted October 2009 through November 2010. The higher the PREDICT targeting score, the more likely the violation. If an FDA reviewer selects an import with a score of 90%, the chances of a violation are about 9% (Silver 2011). The success of the PREDICT program shows that changing procedures to keep pace with trade can be effective and leads to proposition two:

P2: Modern procedures can be successful in detecting illicit goods while minimising the impact on legal trade.

3.3 Technology

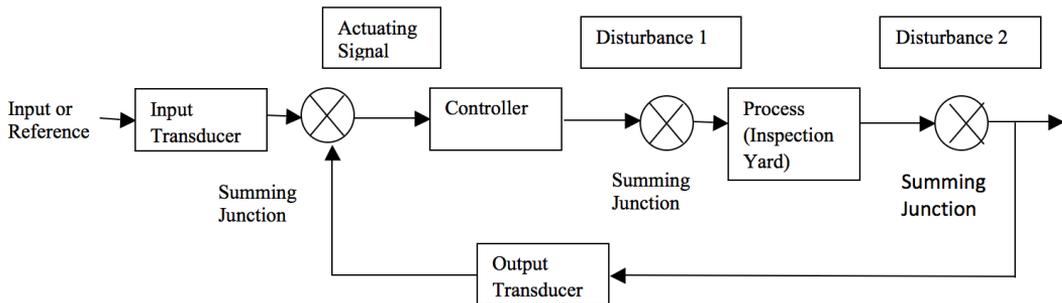
Information technology (IT) has penetrated the office and services environment since 1978 (Attaran 2003). According to the World Customs Organization (WCO), customs authorities must take advantage of new and emerging technologies to enhance, amongst others, processing, risk management, intelligence and non-intrusive detection (WCO 2008).

The technologies and methodologies for a collaborative e-commerce platform are already proven by well-established examples of logistics networks. Those allow the exchange of electronic messages between commercial and logistics operators as well as providing for the interchange, at national level, of certain messages with customs and other government authorities (Pugliatti 2011). Currently industrial best practices include the use of advanced technology to both improve performance and minimise risk (Derry 2012).

There are several additional approaches to technology which have not been discussed in the literature so it is not known if these are being implemented in any customs organisation. For example, control theory (Kuo & Golnaraghi 2003) has been effectively used in electrical engineering. The basis of control

theory is to define the system mathematically and then develop a mathematical solution which minimises oscillation around the control point. This technique is common in electrical engineering but has not been used in logistics. A generic model for control theory is shown in Figure 2.

Figure 2: Basic control schematic



Source: Kuo & Golnaraghi 2003.

The mathematics of control theory is rigorous, but the results may yield large benefits in understanding what input fluctuations do to the system. The basics for solving control problems are as follows:

- finding a solution to the nonlinear differential equations
- linearising the nonlinear differential equations at the resulting solution
- finding the Laplace Transform of the resulting linear differential equations
- solving for the outputs in terms of the inputs in the Laplace domain (Brogan 1991).

This concept is not unknown in business; economists term the construct involving multiple inputs with multiple possibilities and consequences as multiple equilibria (El-Erian 2008). The reason this type of analysis is important is that it recognises that in both physical science and economics, multiple variables may deviate from the expected, and the resulting interaction can cause significant unwanted results. This is directly related to the flow of commercial traffic at ports of entry because multiple variables can change unexpectedly (loss of inspection equipment, delayed arrivals at the inspection yard, congestion leaving the yard, computer failure, etc.). Maximising the resources available to customs officials allows for the use of advanced analytical techniques, which can better explain these interactions and their unintended consequences leading to the third proposition:

P3: The proper use of state of the art technology to quickly move goods through ports of entry is positively related to trade.

3.4 Time-focused

In trade, as in all economic activity, time has an economic cost. Hence, savings in time in transit have a clear economic benefit. The benefits of reduced cycle time have been clearly demonstrated in various industries (Stevenson 2011). Cycle time reduction has become a significant concern for those doing global business. The longer products take to get to market, the more likely they will perish, become outdated, be displaced by superior alternatives, or lose the interest of potential buyers. Previous research has shown that a 10% cut in delivery time will, other things being equal, expand exports of time-sensitive manufactures by over 4% (Holloway & Rae 2012).

If goods are slow to cross international boundaries, cost increases. Cirincione reports the estimated time to conduct a physical inspection of a container is four hours involving 15 to 20 customs officers

(Cirincione, Cosmas, Low, Peck, & Wilds 2007). This evidence shows the need to increase efficiency in the screening process of imported goods because anything that impedes the supply chain flow has a direct impact on competitiveness (Ngai 2011). From this we can postulate:

P4: The faster goods move through the entire supply chain positively impacts global trade.

3.5 Cost

Transaction cost has been important for modern economics and is especially significant for studying institution system and social structure transformation since Ronald H Coase first proposed it in 1937 (Lv, Liu & Wang 2012). The impact of cost is most obvious in the global supply chain when the bureaucracy of customs and border security, and the associated transaction costs of crossing international borders are considered (Ngai 2011). Long delays at borders and attendant costs ultimately raise the cost of the goods, making both the firms using particular ports of entry and the countries of those ports of entry noncompetitive (Raj Jain 2012). For example, consider the case of Title XVII, Maritime Cargo of Public Law 110– 53—AUG. 3, 2007, which requires 100% scanning of all containerised freight entering the US. The concern with implementation of this law is the widespread congestion that would result from this action. The action can best be described by the theory of constraints (Goldratt & Cox 1986), which is based on the concept of identifying the limiting or constraining process in an operation and eliminating the obstacle. The concept behind this theory is that increasing flow through the constraint will result in an overall improvement in throughput in the process. Implementation of the 100% Container Scanning Law is contrary to the theory of constraints. Several researchers have expressed concern about this law and its impact on the adverse effect, including costs, on the global economy due to the adverse impact on the global supply chain (Bakshi, Flynn & Gans 2010; McNeill & Zuckerman 2010; Nguyen 2012). Contrary to the current actions of the US CBP, research has continually shown that reducing such costs stimulates international trade, investment and business innovation (Holloway & Rae 2012). This research leads to the fifth proposition, which is:

P5: Minimising cost at port of entry operations is positively related to trade.

3.6 Mission

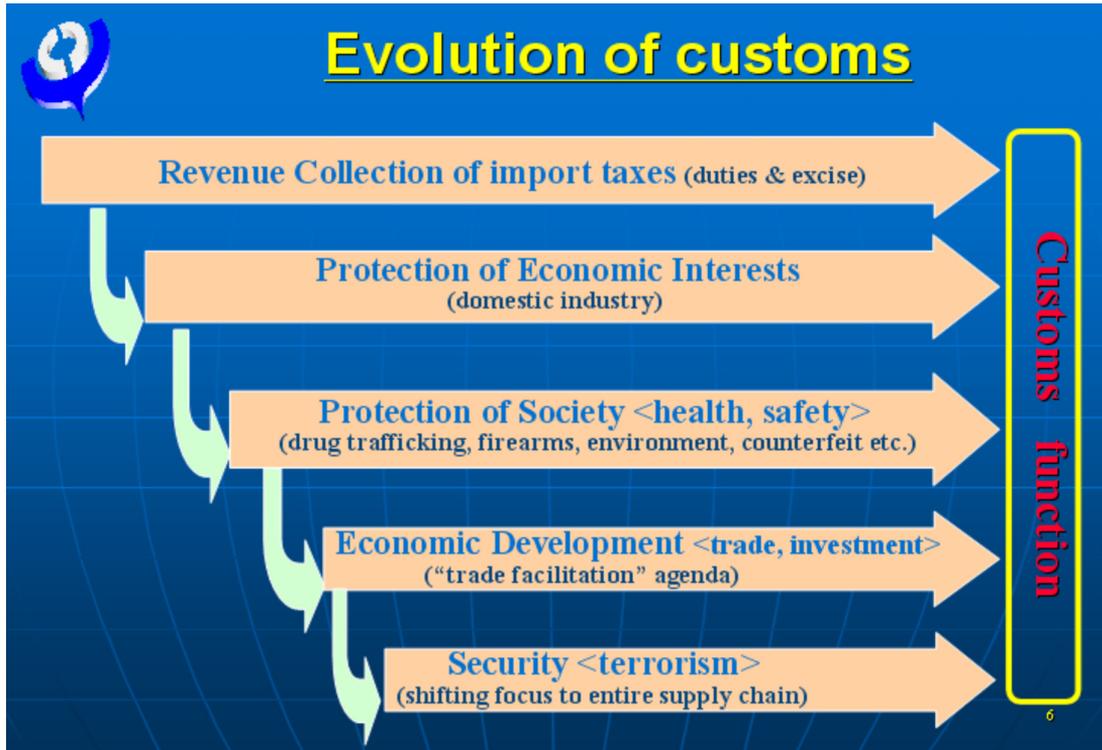
This section has been deliberately presented last because it should be the focus that drives all of the previously submitted topics. Strategy is easiest understood as “how are we going to get there?” (Gamble, Thompson & Peteraf 2013). Essentially, strategic management is the formulation of necessary resources to accomplish the organisation’s long term goals. The starting point of any successful strategic plan is the organisation’s mission statement. This is important when considering the role of customs in global trade. Consider, for example, the evolution of customs over the past thousand years. Mikuriya (2007) has done an excellent job of doing this and a summary of this evolution is shown in Figure 3.

The US has followed this progression completely. The original mission of the Customs Service, the collection of tariffs, was established by President George Washington with the signing of the Tariff Act on 4 July 1789. However, consider the current mission statement of the US CBP:

We are the guardians of our Nation’s borders. We are America’s frontline. We safeguard the American homeland at and beyond our borders. We protect the American public against terrorists and the instruments of terror. We steadfastly enforce the laws of the United States while fostering our Nation’s economic security through lawful international trade and travel. We serve the American public with vigilance, integrity and professionalism (CBP 2009).

This is a very revealing mission statement because the overwhelming majority of the mission is focused on protection and defending the US borders. There is only one short phrase regarding economic activity, and that phrase focuses on ‘economic security’. The problem with this mission statement is that for any nation to be secure it must be economically viable. The reason the customs service was initially formed

Figure 3: Evolution of Customs



Source: Mikuriya 2007.

in 1789 was to generate revenue for the US federal government to function. Mission statements are only useful if they match the current environment. The current environment of the world today is global trade.

When an imbalance occurs in an organisation's actions, the result is an imbalance in the organisation's performance. Consider the performance of the US in the world trade arena regarding crossing international boundaries. This analysis is best done by looking at the World Bank's 'Ease of Doing Business Index' (World Bank 2012b). The US is currently ranked as the number twenty country in terms of ease of doing business across borders. The rank of the countries above the US is shown in Table 3.

Of the countries ranked above the US, there are several western European nations and the nation of Israel. The data for Israel clearly shows that for a country which has an overall ranking of 34; it is ranked as the 10th easiest country in the world in terms of doing business across borders. It is obvious that Israel's ability to import and export goods is a competitive advantage for the country. Compare this to the US, which is 4th on the overall list but is 20th in terms of ease of importing and exporting. For the US, the ability to import and export goods is not a competitive advantage but a hindrance in doing business.

Table 3: Ease of Doing Business versus Trading across Borders ranking

Economy	Ease of Doing Business rank	Trading across borders
Singapore	1	1
Hong Kong SAR, China	2	2
Estonia	24	3
Korea, Republic of	8	4
United Arab Emirates	33	5
Finland	11	6
Denmark	5	7
Sweden	14	8
Norway	6	9
Israel	34	10
Panama	61	11
Germany	19	12
United Kingdom	7	13
Netherlands	31	14
Latvia	21	15
Japan	20	16
Thailand	17	17
Saudi Arabia	12	18
Cyprus	40	19
United States of America	4	20

Source: World Bank ‘Ease of Doing Business Index’ 2012b.

Figure 4 shows the individual rating factors and their correlations. The way this data is interpreted is that the higher the individual correlation scores (which can range from 0.00 to 1.00), the more important the individual variable is as compared to another variable.

As seen from the data represented in Figure 4, the correlation between trading across borders and all other variables ranges from 0.27 to 0.45. These are all significant correlations, but those above 0.40 are particularly important and, in this case, trading across borders has a 0.40 or greater correlation for five of the nine variables. This means the ability of the US to make cross border trading easier will have a significant impact on the country’s ability to compete globally.

Figure 4: Ease of Doing Business variable correlations

	Dealing with construction permits	Registering Property	Getting credit	Protecting investors	Paying taxes	Trading across borders	Enforcing contracts	Resolving insolvency	Getting electricity
Starting a business	0.39	0.32	0.45	0.59	0.37	0.45	0.42	0.45	0.28
Dealing with construction permits		0.22	0.19	0.25	0.36	0.45	0.20	0.33	0.40
Registering property			0.39	0.29	0.31	0.27	0.49	0.33	0.24
Getting credit				0.47	0.20	0.41	0.42	0.52	0.24
Protecting investors					0.37	0.39	0.29	0.37	0.20
Paying taxes						0.40	0.27	0.33	0.40
Trading across borders							0.35	0.50	0.56
Enforcing contracts								0.42	0.21
Resolving insolvency									0.32

Source: Doing Business Database 2011.

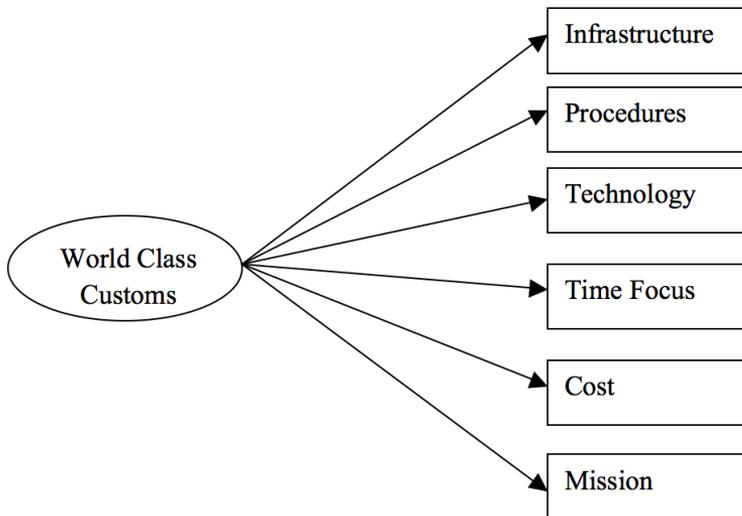
This results in proposition six, which is:

P6: If a country's customs mission statement is properly aligned with both the country's goals and the current operating environment, international trade is increased.

Model

The literature presented in the previous sections allows for the construction of a theoretical model of world class customs. The use of models allows researchers to confirm the presence of causal constructs and their effects on a dependent variable in a cost effective manner. Figure 5 is the proposed model for world class customs.

Figure 5: World class customs model



Developed by Coyle, Cruthirds, Naranjo & Nobel 2013.

The model represented in Figure 5 can be tested using confirmatory factor analysis (CFA). This has been shown to be an effective technique for analysing complex interactions as an initial technique for developing models (Hair, Anderson, Tatham & Black 1998). The propositions for this model have been shown to be theoretically supported. The next step will be to develop the individual measures for each of the individual constructs and then test the model. Since global trade has become such a significant part of the world's economy, it will be best to develop the model using world data, not data from one country.

4. Concluding comments and recommendations for future research

This paper has presented a new mechanism for evaluating customs operations. Rather than considering individual functions and evaluating them in terms of "best in class", this paper has presented an argument that the idea of world class customs should be developed, and the constructs presented in this paper are a first attempt at this effort. While the model is supported by literature, there is no empirical evidence to support this, and the next step should be empirical testing of the model.

One shortcoming of this paper is the brevity of each of the subjects. It is recommended that future research be dedicated to better exploring the individual constructs. As an example, in the procedures section, a brief mention was made about education. A detailed analysis of the educational training given customs officials should be made. The cursory investigation for this paper indicates that most of the educational training given customs officials concentrates on legal, law enforcement, and compliance education and training. There is little evidence that customs officials are given management education or

management training. Management education is critical to the improvement of any organisation because this topic deals with effective leadership, problem solving, and team building and provides students with broader exposure to the world of business. As anecdotal evidence, one of the authors of this paper has spent considerable time with multiple senior level CBP managers, and all complain of their lack of knowledge of the world economy and state of the art control processes.

Another area not given much attention in this paper is the actual mechanism for implementing world class customs ideas. This falls under the construct of strategic management and one reasonable idea for consideration would be to develop an improvement strategy as follows:

1. **Select a pilot location.** For the purpose of this project, the pilot location needs to be accessible to the researchers. This will minimise cost and speed analysis of ideas.
2. **Analyse existing data.** The data analysis will include both a flow analysis which is based upon two known scientific principles: queuing theory (Stevenson 2011) and theory of constraints (Goldratt & Cox 1976).
3. **Develop a data driven strategy.** This strategy will be based upon site-specific capabilities and best technology/industry practices and supported by facts.
4. **Conduct a pilot program.** Make changes and recommendations based on results supported by the data.
5. **Develop new research initiatives.** There are several promising technologies, some of which have been discussed in this paper. Research supports the use of control theory as an operational tool and the use of computer algorithms as excellent tools which could be tested in a customs environment.
6. **Educational improvements.** Previous discussions with both CBP representatives and members of the private sector have indicated a general lack of knowledge in both business management in CBP and a lack of knowledge regarding customs procedures within the private sector.

Academics, customs officials, and practitioners working together should be able to identify the necessary elements of world class customs which will better facilitate the flow of legal goods while, at the same time, increasing the ability to interdict illegal goods.

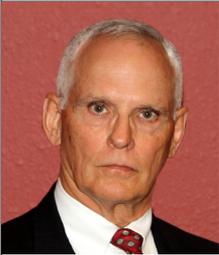
References

- Accenture Consulting Group 2008, Improving outcomes by reducing border delays, unpublished report for the United States Department of Commerce.
- Asakura, H 2003, *World history of the customs and tariffs*, World Customs Organization, Brussels.
- Attaran, M 2003, 'Exploring the relationship between information technology and business process reengineering', *Information & Management*, vol. 41, pp. 585-96.
- Bakshi, N, Flynn, SE & Gans, N 2010, 'Estimating the operational impact of container inspections at international ports', *Social Science Research Network*, viewed 21 January 2013, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1664386.
- Bersin, A 2012, 'Lines and flows: the beginning and end of borders', *Brooklyn Journal of International Law*, vol. 37, no. 2, pp. 389-406.
- Brogan, W 1991, *Modern control theory*, Prentice Hall, Upper Saddle River, NJ.
- Burfisher, ME, Robinson, S & Thierfelder, K 2004, 'The impact of NAFTA on the United States', *Journal of Economic Perspectives*, vol.15, no. 1, pp. 125-44.
- Coyle, T 2011, Interview with Assistant Commissioner, Customs and Border Protection; name withheld.
- Cirincione, R, Cosmas, A, Low, C, Peck, J & Wilds, J 2007, 'Barriers to the success of 100% maritime cargo container scanning, Final Report', Introduction to Technology and Policy, Massachusetts Institute of Technology Engineering Systems Division, Massachusetts Institute of Technology, Cambridge, MA.

- Customs and Border Protection (CBP) 2009, Mission statement, viewed 21 January 2013, www.cbp.gov/xp/cgov/about/mission/guardians.xml.
- Daft, R 2006, *Management*, 6th edn, Thompson-Southwestern, Mason, OH.
- Derry, T 2012, 'Be prepared', *Supply Management*, vol. 24, no. 1, p. 6.
- Doyle, T 2012, 'Rethinking customs' procurement practices to deliver improved business outcomes', *World Customs Journal*, vol. 6, no. 2, pp. 95-9.
- El-Erian, M 2008, *When markets collide*, McGraw-Hill, New York.
- Fasoranti, M 2012, 'The effect of government expenditure on infrastructure on the growth of the Nigerian economy: 1977-2009', *International Journal of Economics and Financial Issues*, vol. 2, no. 4, pp. 513-18.
- Gamble, J, Thompson, A & Peteraf, M 2013, *Essentials of strategic management*, McGraw-Hill, New York.
- Goldratt, E 2004, *The goal: a process of ongoing improvement*, North River Press, Great Barrington, MA.
- Goldratt, E & Cox, J 1986, *The goal*, North River Press, Croton-on-Hudson, New York.
- Goldsby, TJ & Stank, TP 2000, 'World class performance and environmentally responsible logistics practices', *Journal of Business Logistics*, vol. 21, no. 2, pp. 187-208.
- Gwardzińska, E 2012, 'The standardisation of customs services in the European Union', *World Customs Journal*, vol. 6, no. 1, pp. 93-9.
- Hair, J, Anderson, R, Tatham, R & Black, W 1998, *Multivariate data analysis*, 5th edn, Prentice-Hall, Upper Saddle River, NJ.
- Hannan, MT & Freeman, J 1984, 'Structural inertia and organizational change', *American Sociological Review*, vol. 49, pp. 149-64.
- Hesketh, D 2010, 'Weaknesses in the supply chain: who packed the box?', *World Customs Journal*, vol. 4, no. 2, pp. 3-20.
- Holloway, S & Rae, J 2012, 'De minimis thresholds in APEC', *World Customs Journal*, vol. 6, no. 1, pp. 31-62.
- Industry Trends and Developments 2011, *Shipping Report*, Q3 2011, vol. 3, no. 3, pp. 37-40.
- Jansen, K 2004, 'From persistence to pursuit: a longitudinal examination of momentum during the early stages of strategic change', *Organization Science*, vol. 15, no. 3, pp. 276-94.
- Koslowski, R 2011, 'The evolution of border controls as a mechanism to prevent illegal immigration', viewed 10 February 2014, www.migrationpolicy.org/pubs/bordercontrols-koslowski.pdf.
- Kuo, B & Golnaraghi, F 2003, *Automatic control systems*, John Wiley & Sons, Hoboken, NJ.
- Lv, Z, Liu, Q & Wang, P 2012, 'Literatures review on transaction costs measurement advances', *Asian Social Science*, vol. 8, no. 12, pp. 127-32.
- McNeill, J & Zuckerman, J 2010, 'The cargo-screening clog: why the maritime mandate needs to be re-examined', The Heritage Foundation, viewed 17 December 2012, www.heritage.org/research/reports/2010/01/the-cargoscreening-clog-why-the-maritime-mandate-needs-to-be-reexamined.
- Mikuriya, K 2007, 'Trade facilitation and the role of WCO', Report on the High Level Meeting on Trade Facilitation in the Asia Pacific Region, World Customs Organization, Brussels.
- Miller, D & Friesen, PH 1980, 'Momentum and revolution in organizational adaptation', *Academy of Management Journal*, vol. 23, no. 4, pp. 591-614.
- Mongeluzzo, B 2011, 'Bordering on change', *Journal of Commerce (15307557)*, vol. 12, no. 16, pp. 16-17.

- Ngai, C 2011, 'Border delays said to be hindering steel trade', *Metal Bulletin Daily*, (AMM), vol. 266, no. 252.
- Nguyen, T 2012, 'Changes to the role of US Customs and Border Protection and the impact of the 100% container scanning law', *World Customs Journal*, vol. 6, no. 2, pp. 109-18.
- Pethokoukis, J 2012, 'GDP collapse puts U.S. economy into recession red zone', American Enterprise Institute, viewed 23 January 2013, www.aei-ideas.org/2012/09/gdp-collapse-puts-u-s-economy-into-recession-red-zone/.
- Preece, R 2012, 'Excise taxation of key commodities across South East Asia: a comparative analysis ahead of the ASEAN Economic Community in 2015', *World Customs Journal*, vol. 6, no. 1, pp. 3-16.
- Pugliatti, L 2011, 'Cloud single window: legal implications of a new model of cross-border single window', *World Customs Journal*, vol. 5, no. 2, pp. 3-20.
- Raj Jain, S 2012, 'Coordinated border management: the experience of Asia and the Pacific region', *World Customs Journal*, vol. 6, no. 1, pp. 63-76.
- Research and Innovative Technology Administration (RITA) 2011, US Department of Transportation, Bureau of Transportation Statistics, viewed 31 October 2011, www.bts.gov/programs/international/transborder/TBDR_BC/TBDR_BC_QuickSearch.html.
- Siekman, P 2003, 'Protecting America's ports', *Fortune*, vol. 148, no. 10, viewed November 2012, http://money.cnn.com/magazines/fortune/fortune_archive/2003/11/10/352854/index.htm.
- Shang, Kuo-Chung & Sun, Li-Fang 2004, 'Taxonomy in logistics management: a resource-based perspective', *International Journal of Management*, vol. 21, no. 2, pp. 149-65.
- Silver, R 2011, 'FDA "PREDICT" tool for import screening', presentation at the Border Trade Alliance Meeting, McAllen, TX.
- Stevenson, WJ 2011, *Operations management*, 11th edn, McGraw-Hill/Irwin, New York.
- The International Air Cargo Association 2013, viewed 8 January 2013, www.tiaca.org/tiaca/Customs_Performance_Standards_Best_Practices.asp.
- Waters, CDJ 1999, 'Changes to road transport in Poland during a period of economic transition', *International Journal of Physical Distribution and Logistics Management*, vol. 29, pp. 122-37.
- Widdowson, D 2007, 'The changing role of Customs: evolution or revolution?', *World Customs Journal*, vol. 1, no. 1, pp. 31-7.
- World Bank 2012a, 'GDP data by country', viewed 12 November 2012, <http://data.worldbank.org/data-catalog/GDP-ranking-table>.
- World Bank 2012b, 'Ease of Doing Business Index', viewed 12 November 2012, www.doingbusiness.org/rankings.
- World Bank 2013, 'Ease of Doing Business Index 2013', viewed 17 February 2014, www.doingbusiness.org/rankings.
- World Customs Organization (WCO) 1999, *International Convention on the Simplification and Harmonization of Customs Procedures (as amended)*, (Revised Kyoto Convention), WCO, Brussels.
- World Customs Organization (WCO) 2008, 'Customs in the 21st century: enhancing the WCO for its 21st century role: progress report', WCO, Brussels.
- World Trade Organization (WTO) 1998, Statement of the Chairman of the Council for Trade in Goods on 18 March 1998, WTO Trade Facilitation Symposium, Geneva, March.

Tom Coyle



Dr Tom Coyle has a B.S. in Metallurgical Engineering, an MBA and a PhD in Business Administration. He worked in industry for thirty years in various engineering and manufacturing management positions before beginning his academic career. During his professional career, Tom was responsible for manufacturing operations in the United States of America, Mexico and Ireland. He currently serves as the Interim Department Chairman of Management and Marketing at the University of Texas at Brownsville. He also teaches various topics related to Operations Management, Supply Chain Management and Strategic Management. Tom is also active in the local community and currently serves as Chairman of the Education Committee for the Matamoros, Mexico Maquiladora Association.

Kevin Cruthirds



Dr Kevin W Cruthirds is an Assistant Professor of Management at the University of Texas at Brownsville where he teaches Operations and Supply Chain Management. He earned a Bachelor of Business Administration from Loyola University of New Orleans, an MBA and a PhD in International Business with emphasis on Management from the University of Texas – Pan American. Kevin has extensive industry experience having worked as a factory manager, industrial engineer and project manager in the United States of America, Mexico and the Dominican Republic. His research interests include Green Logistics, Lean Manufacturing and Customs and Border Crossing Logistics.

Sara Naranjo



Sara Naranjo is a Graduate Research Assistant in the University of Texas at Brownsville. She has worked in logistics and materials management in the automotive, electronics, and aerospace industries. Sara holds a bachelor's degree in Industrial and Systems Engineering, a master's degree in Logistics and Materials Management and is currently enrolled in the MBA program at the University of Texas at Brownsville.

Katharina Nobel



Katharina Nobel is a Graduate Research Assistant at the University of Texas at Brownsville. She completed dual vocational training and then worked in the banking industry in Germany for several years. Katharina holds a bachelor's degree in International Business and is currently pursuing an MBA at the University of Texas at Brownsville.

