A new approach to e-commerce customs control in China: integrated supply chain – a practical application towards large-scale data pipeline implementation

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Abstract

Developments in e-commerce are presenting new challenges in customs control and China's customs agency is developing a new approach to how it addresses these challenges. China Customs has adopted an integrated supply chain approach to secure international trade lanes and to facilitate legitimate trade. We present a case study analysis of an integrated supply chain company that integrates the transaction, declaration, logistics and financial services of e-commerce customers on its platform, and we show how this integration can also be used by China Customs to more effectively manage supply chain risks. We show how this new approach benefits traders, customs and government. We also analyse this case study in the context of the World Customs Organization's (WCO) SAFE Framework.

1. Introduction

As e-commerce continues to grow and develop, it is expected that China Customs will be faced with specific e-commerce challenges. In this paper we present solutions to five of these challenges.

The first challenge for China Customs is that they do not have the resources to adequately control the increasing number of small and medium-sized enterprises (SMEs) that are without 'authorised economic operator' (AEO) status. Ten years ago there were approximately 100,000 companies in China that were either importing into or exporting from China. Most of these companies were large and more likely to be equipped to deal with the many administrative complexities associated with border clearance procedures and logistics. Now, however, there are an estimated one million traders in China, with most of these being SMEs. The anticipated number of traders over the next three to five years is five million.[2] With the boom in cross-border electronic commerce, for example in Europe and the United States (US), it is clear that more and more SMEs will be involved in the international trade of multiple commodity categories.

Table 1: China general goods import and export figure in USD per company categories

Year	USD100,000,000	Export	Export Ratio	Import	Import Ratio	Import&Export	Total Ratio
2014	State Owned	2565	11%	4911	25%	7477	17%
	Foreign Enterprise	10744	46%	9095	46%	19839	46%
	SMs	10070	43%	4767	24%	14837	34%
	Total	23425		19608		43033	
2013	State Owned	2490	11%	4990	26%	7480	18%
	Foreign Enterprise	10443	47%	8748	45%	19191	46%
	SMs	9129	41%	4709	24%	13837	33%
	Total	22100		19503		41603	
2012	State Owned	2563	13%	4954	27%	7517	19%
	Foreign Enterprise	10228	50%	8713	48%	18940	49%
	SMs	7666	37%	3814	21%	11480	30%
	Total	20489		18173		38663	
2011	State Owned	2672	14%	4934	28%	7606	21%
	Foreign Enterprise	9953	52%	8648	50%	18602	51%
	SMs	6337	33%	3344	19%	9681	27%
	Total	18986		17435		36421	
2010	State Owned	2344	15%	3875	28%	6219	21%
	Foreign Enterprise	8623	55%	7380	53%	16003	54%
	SMs	4797	30%	2492	18%	7289	25%
	Total	15779		13948		29728	

Source: Customs-info.com (Year 2015 data not available).

The second challenge is that these new companies (particularly SMEs) lack knowledge and professional expertise about customs regulations and procedures – such as those related to the Harmonised System (HS), valuation, origin, and quarantine – and therefore have a low level of customs compliance. It is quite common that shipments are delayed at the border due to non-compliance, which results in extra supply-chain costs and lead-time for the traders. Also, SMEs generally have low credit ratings and find it more difficult to get loans from banks, and experience delays in receiving their export tax refunds from China's taxation and customs authorities.

The third challenge is that there has been a considerable increase in the number of SMEs that falsely claim tax refunds on the export of non-existent goods (State Administration of Taxation 2015, n.d.). To accelerate the development of exports from China, its taxation authority organised an accelerated release of tax refunds for exported goods. In 2009, although the export volume from China decreased by 16 per cent, the export tax refund increased by 11 per cent. In 2011, China's export volume increased by only 20 per cent, while the export tax refund increased by 26 per cent, which indicates that the extent of fraudulent export tax refund claims may be considerable (Kong 2014).

Between 2011 and 2013, the State Administration of Taxation retrieved about USD1.3 billion in tax from fraud, and in the first six months of 2014 retrieved USD0.27 billion[3] Similar cases of tax fraud have also been reported in Thailand (Jinakul & Jinathongpradit 2000), while an investigation in the Netherlands found that about 44 per cent of all value-added tax (VAT) fraud involved false tax claims based on forged invoices for non-existent or exaggerated purchases (Keen 2007). In the United Kingdom (UK) VAT revenue losses through tax evasion jumped sharply in 2005–2006, reaching GBP12.4 billion, or 14.5 per cent of potential VAT revenues. Her Majesty's Revenue and Customs (HMRC) estimated that missing trader and carousel fraud accounted for less than a quarter of these losses (Smith 2007, pp. 167–77). One case in the UK involved a complex GBP176 million VAT scam relating to the fake sale of four million phones, with millions of pounds in VAT payments being claimed through ghost companies (Garside 2012).

The fourth challenge is that customs controls rely on the data contained in import and export declarations, but these declarations often contain inaccurate information about the cargo. Although all parties in international supply chains (such as traders, carriers, brokers, terminal operators and shipping agencies), are obliged by law to provide accurate data and declare all types of information related to goods, carriers,

brokers and agents do not always know what is in a container and they often use the term, 'said to contain' (STC) in the declarations to protect themselves against liability in case of theft or damage to the goods. For example, if a weapon of mass destruction was shipped by container through an international supply chain, it is estimated that it would cost the supply chain approximately AUD1.3 trillion (Eggers 2004, p. 4). It is also observed that information management (in particular the sharing of cargo data by parties in a supply chain), and partner relationship management have significant positive effects on container safety performance (Yang 2013).

The fifth challenge is fragmentation of supply chain information (see Figure 1). Customs does not receive all the supply chain information as, for example, the logistics information, such as the vessel or aircraft manifest, is owned by the carrier; the trade transaction information is owned by the buyer (consignee) and the seller (consignor); while the payment information is owned by the banks. In order to obtain all the relevant information across the whole supply chain, Customs needs to invest resources to collect the fragmented data from the different parties in the supply chain, and then analyse it.

Figure 1: Fragmentation of supply chain information
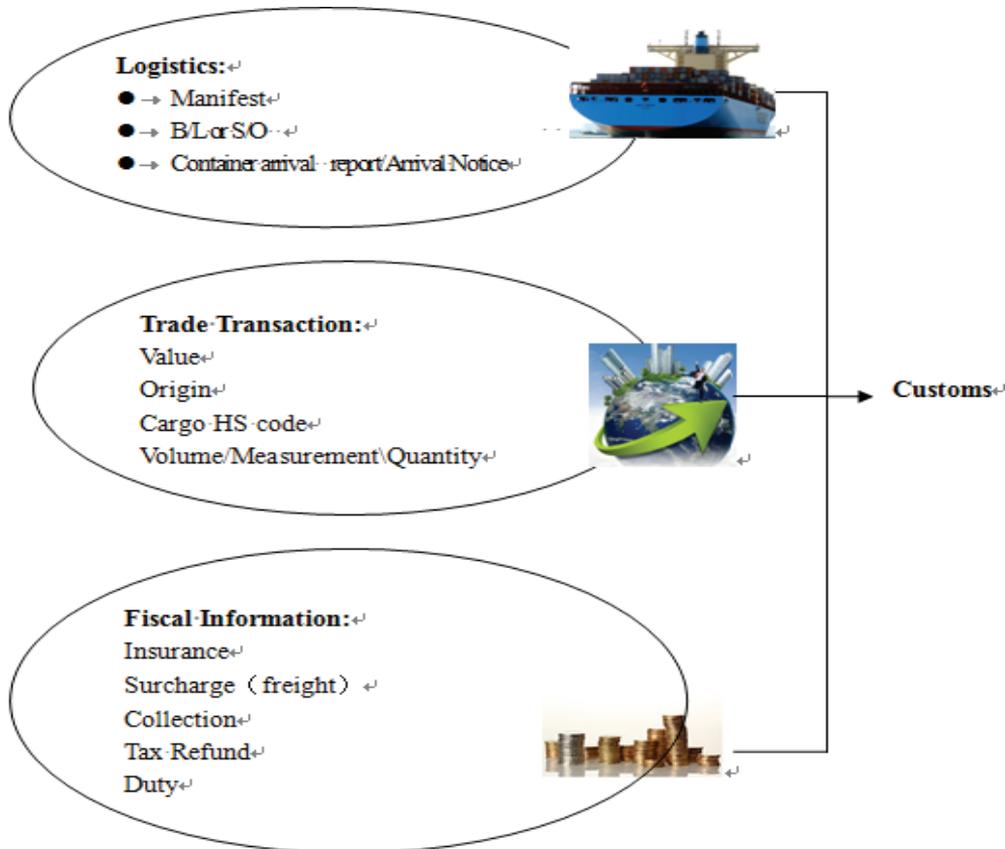
2. A solution for these challenges

Stakeholders in the supply chain and the inspection authorities, such as Customs, have realised that reducing the burden on business and helping stakeholders with their statutory obligations (such as providing the required customs information and complying with increasingly complex regulatory demands), has become a cornerstone of cross-border trading (Hesketh 2009, 2010; Tan et al. 2011). One way to facilitate this is to adopt the concept of a 'data pipeline' since such data-sharing infrastructure leads to the availability of better quality data in the supply chain (Klievink et al. 2012).

The data pipeline is a concept that forms the basis of a data information interchange platform, but it is still in an experimental phase, and more time is needed to develop certain aspects, such as standards, authorisations, financing structures and data sensitivity (Klievink et al. 2014). If we can find new solutions to combine the data pipeline concept with additional functions and possibilities for e-commerce customs control, it should prove to be more useful for the World Customs Organization (WCO) and its members.

2.1 Principles of a new approach

A proposed new approach is underpinned by four principles, which are outlined below.

Principle 1: Shared responsibility on risk control

E-commerce control should not be the sole responsibility of Customs; enterprises should also be involved. The WCO *SAFE Framework of Standards to Secure and Facilitate Global Trade* (SAFE Framework) states that the cooperation between Customs and economic operators is one of its main pillars, which means that firms should also be able and willing to share the liability and management of risk with Customs. As more inspection leads to congestion and low efficiency, incentives should be developed that encourage firms to improve security upstream in the supply chain (Bakshi & Gans 2010). At the same time, a public-private partnership (PPP) attitude is recommended (Hintsa 2010).

### Principle 2: Supply chain information integration

Supply chain information should be integrated, so that Customs has easy access to all relevant supply chain information, rather than having to collect different information from different sources, which is the current situation (Van Stijn 2011). For example, duty collection is an important task for Customs, and it is easy for traders to falsify invoices, which impacts the calculation. Also, regular variations in the price of goods make it difficult for Customs to determine the correct value. When Customs suspects that the declared value is not accurate it needs to verify the authenticity of valuations, which may take at least 20 days (European Commission, Taxation and Customs Union n.d.). In this situation, exporters incur extra costs and their supply chain is delayed due to declaration suspension. However, with the availability of integrated supply chain information, Customs could more easily ascertain the true transaction information, such as price, insurance and freight costs, which would then avoid delays.

Principle 3: Earlier risk control

Implementing risk control measures earlier in the supply chain will help Customs identify compliant traders. The earlier Customs is involved, or obtains the data from the supply chain, the more time Customs has to conduct a risk analysis. The US rolled out the Container Security Initiative (CSI) and Automated Manifest System (AMS) in 2002, and the European Union (EU) started using the advanced entry summary declaration (ENS) for security analysis in 2009.[4] However, this ENS data is only provided at the container-loading points in the ports, while the supply chain starting points occur earlier than loading at the container terminals. The EU's best practice in security can be seen in the Customs Security Programme (CSP), which includes advanced control equipment (such as Non-Intrusive Inspection (NII) facilities); international customs cooperation; Authorised Economic Operator (AEO) status; risk selection; and pre-arrival and pre-departure processes (European Commission, Taxation and Customs Union 2006).

Currently, however, risk controls do not commence at the starting points of supply chains. Data elements from different sources in the supply chain are collected at the consignment completion point (CCP), which is the location where the goods are actually loaded into the container, while the waypoint is where the container is actually packed (Van Stijn 2011). Compared with traditional declaration data filing points – ENS/AMS filing points or the CCP waypoints – the integrated supply chain risk control point starts at the vendor factory, which is earlier in the chain (see Figure 2).

Figure 2: Risk control starting points of integrated supply chain, Data Pipeline CCP, current mode
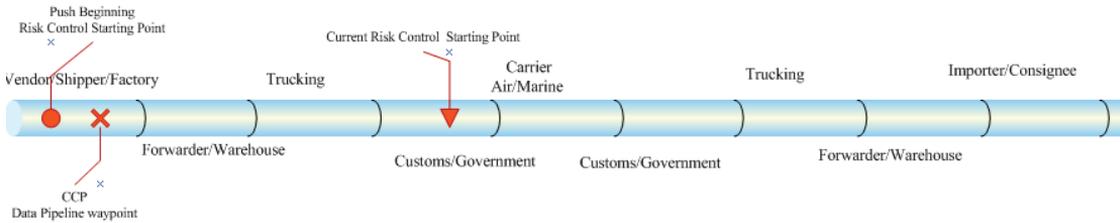
Principle 4: Supply chain compliance and trade facilitation

The data pipeline is an IT infrastructure which can help traders to improve their supply chain compliance. An integrated supply chain can make data sharing more efficient and help traders improve their supply chain service. For example, a company using an integrated supply chain can readily check such information as the commodity ingredient information (which is vital to the HS code verification), various restrictions such as those relating to the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES), as well as a temporary tariff policy based on their expertise and the data holdings of their IT system. Greater compliance during the supply chain benefits both traders and governments (Hesketh 2010).

3. Case study: OneTouch

OneTouch is a service provider which offers an integrated supply chain service platform that provides customs clearance, logistics, finance, tax refund (import and export) and related services. OneTouch is an AEO, certified by China Customs (Jing 2014). It developed the first import and export management system in China and advanced its standard import and export service system, OneTouch Standard, which was acclaimed by the China Ministry of Science.[5] OneTouch's system can be linked to both traders and logistics service providers. Based on its AEO certification and powerful IT system, China Customs can place a greater degree of reliance on its data. In 2013 the data error ratio of OneTouch was 0.04 per cent, which is much lower than the AEO's average error level of 3 per cent.[6]

To verify the system's accuracy, China Customs undertakes post-clearance audits, and automated data checking against other sources of supply chain data.

3.1 History[7] and operation

OneTouch started in 2001 as an agency for importers and exporters. In 2010 it was acquired by Alibaba and became an integrated supply chain service, which led to rapid growth. There were almost 4,000 clients in 2011, growing to 30,000 clients in 2014, whereas there had been only seven clients in the set-up stage[8] (see Figure 3).

Figure 3: The trader's volume of OneTouch
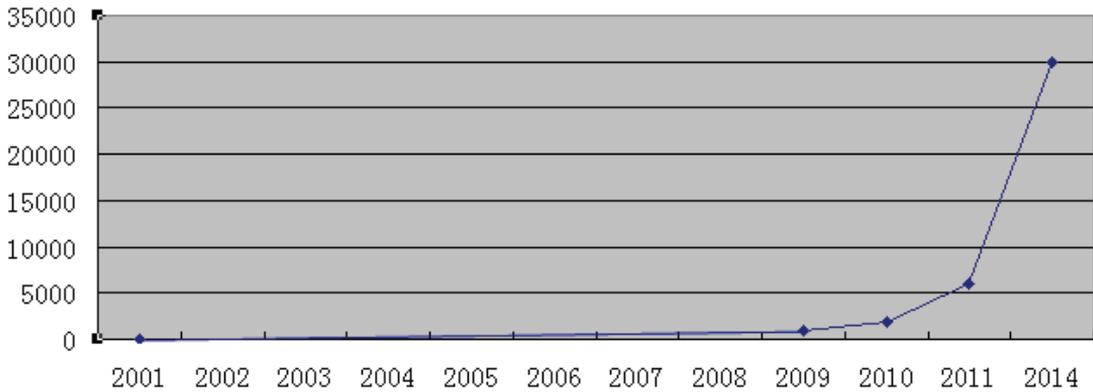
There are several reasons why OneTouch is considered to have been successful. These include a perception that its data is reliable, its provision of credits to traders, and its use of big data.

The purpose of the company's credit services is to encourage more and more traders to use OneTouch services through the use of a foreign trade business-to-business (B2B) credit system. In 2013 data from 1.8 billion batch transactions were held in OneTouch and its credit to traders totalled 55 billion RMB. More than ten banks provide credit to OneTouch, including CITY and DBS banks.[9]

With its use of big data and the availability of more transparent and open supply chain information, OneTouch profits from a variety of supply chain services, including financial, logistics and agency services (including customs broking and forwarding). To show how OneTouch works, two examples are provided: customs clearance and finance.

Customs clearance

Before OneTouch signs agency agreements with traders, it risk assesses the entity (see Table 2). It then acts as a principal in relation to the import and export of the trader's goods, rather than as an agency. Furthermore, before declaring goods to Customs, OneTouch undertakes risk assessments from the perspective of finance, logistics, clearance and tax refunds (see Figure 4). The trader enjoys faster clearance and lower inspections since OneTouch is an AEO, which gives it access to a China Customs client coordinator to facilitate the business.[10]

Table 2: Risk Control Matrix

|		Stage		
		Advance control	**On control**	**Post control**
Risk Control Centre	Clearance	Cargo ownership check	Data verification (Price/weight)	Data analysis (general post-audit)
		Customs valuation check	Logistics verification (Type/Size/Nature)	Parameter setting (adjust risk parameter)
		HS code check	Container load check (Goods vs. Documents)	Client management (Fix if low risk/ Deny if high risk)
				Business process reengineering
	Tax refund	VAT invoice issuer advance audit	Tax refund check	Tax refund documents check
		Client entry check-visit factory	Trade authenticity check	Abnormal documents check
		Financial document check	Tax check	Client communication
	Financial	Order authenticity check	Collection without export Export without collection Abnormal monitoring	Verification (goods vs money)
		Insurance (not goods insurer but transaction credit insurer) company check-insurance issues	Order check/ Contract check	Insurance claim
		Vendor check-visit factory	Quality control/ Inspection report	Legal options
			Goods control	
			Loan management	
	Logistics	Cargo transportation insurance	Logistics document check Logistics handling	Destination handling
		Special goods handling	Freight settlement	Insurance
			Cargo damage/ Loss handling	

Figure 4: Customs clearance advance control
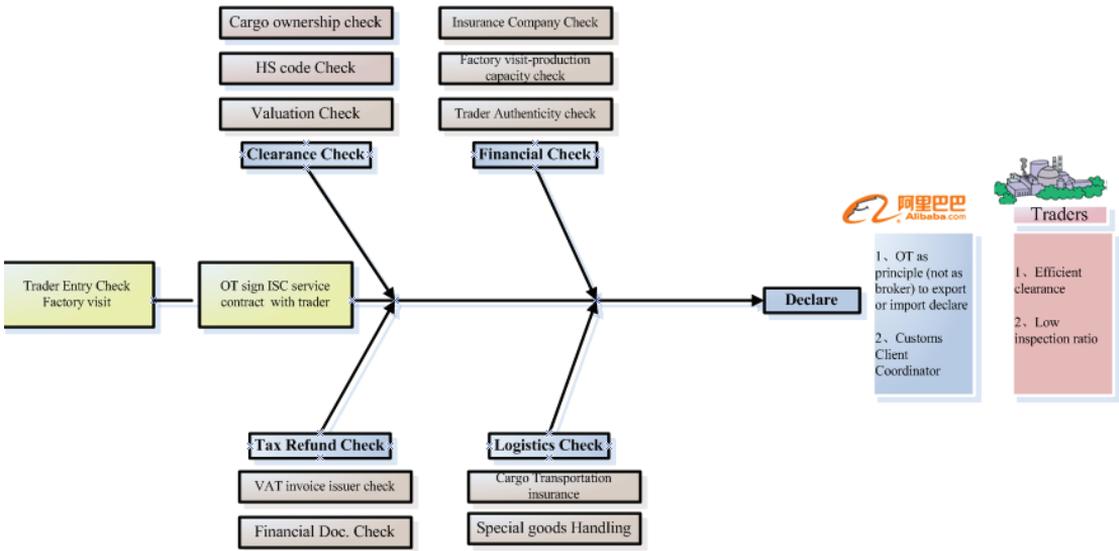
Finance

The payments for goods are remitted into OneTouch's account, with these funds then paid to the trader within one day of receipt. Vendors are also able to obtain loans from OneTouch before the payments are remitted into OneTouch's accounts (see Figure 5). All such data are readily available to Customs, thereby allowing them to use the financial data to conduct risk assessments.

Figure 5: Financial service provided by OneTouch
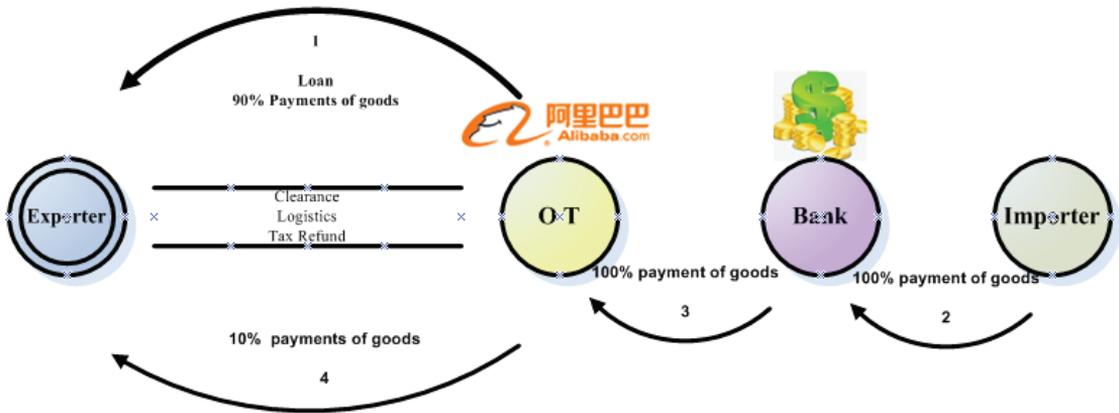
By way of the two examples of customs clearance and finance, it can be seen how OneTouch provides combined clearance, finance and logistics services to traders. More and more SMEs are using the services of companies such as OneTouch, with over 63.7 per cent of SMEs indicating that they wish to use this type of service provider to import and export. Figure 6 illustrates the business interface between OneTouch, operators and government authorities, including Customs.

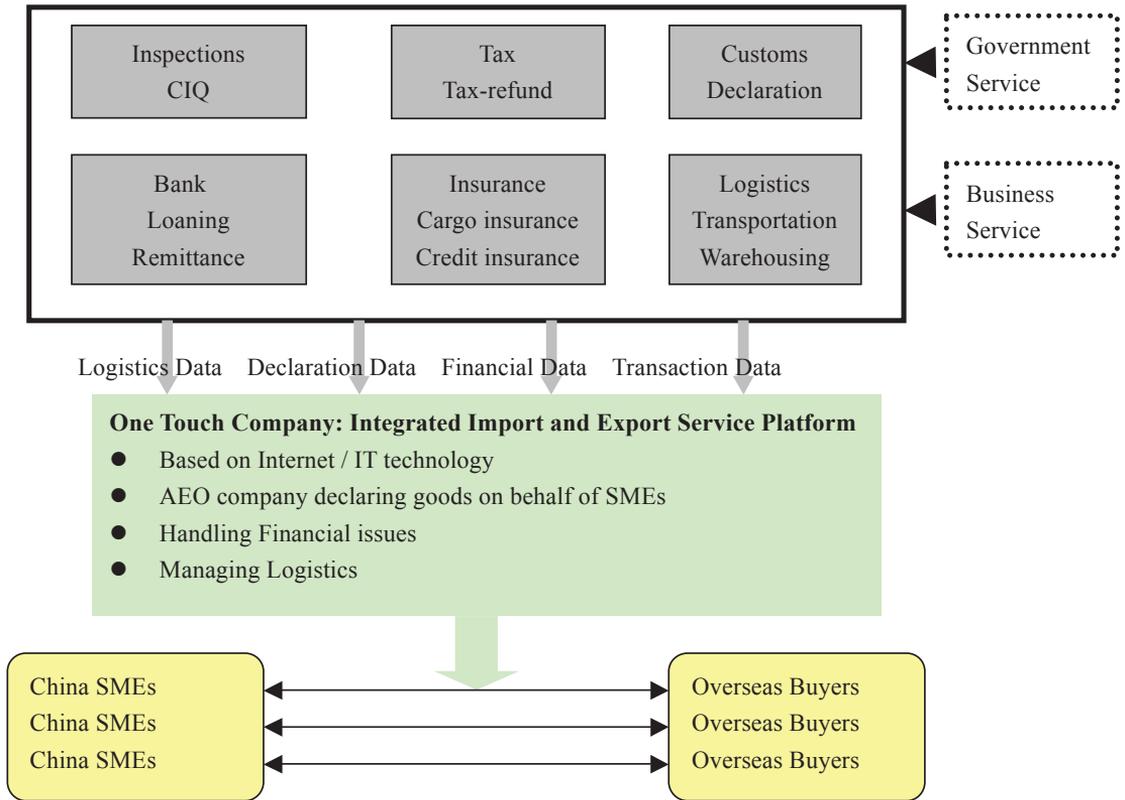*Figure 6: OneTouch company integrated service diagram*

Table 3: OneTouch's rank in the TOP100 biggest export companies in China

Year	One Touch's Rank in the Top100 Biggest Export Company of China
2011	94
2012	9
2013	5
2014	3
2015	2

Source: China Customs Information Website, viewed 17 March 2016, www.haiguan.info/
CompanyTaxis/Detail.aspx?id=260.

3.2 Advantages

There are advantages for operators, customs and other government agencies in using companies such as OneTouch.

Operators

(i) Clearance

- **Faster clearance:** Being treated as an AEO company enables operators to achieve quick release via the green channel. Companies such as OneTouch, which have AEO status, use their own name to declare instead of the actual importer or exporter, and conduct a comprehensive risk control process before declaring to China Customs. China Customs can rely on this data, applying 'push to supply chain starting point' measures on the risk management matrix.

- **Increased compliance:** Common declaration practices that include goods being overweight, incorrectly described, prohibited or restricted suggest that vendors' internal controls are unreliable (Hesketh 2010). OneTouch's management and support injects a higher level of compliance into the traders' supply chain.

- **Less inspections:** Operators benefit from the reduced inspection levels resulting from OneTouch's AEO status, the physical inspection ratio being about 1 per cent, compared to the general inspection ratio of around 4 to 5 per cent[11]). Lower inspection ratios mean less bottlenecks and more efficient customs clearance operations for both imports and exports.

- **Fewer personnel:** Since OneTouch controls the whole integrated supply chain service, the clients/vendors do not need to recruit their own foreign trade staff, which saves client's/vendor's human resource and management costs.

- **Lower logistics costs:** OneTouch provides professional logistics services in all main ports in China, which save operators' logistics cost due to the economies of scale.

(ii) Finance

- **Cash flow**: After cargo departure, payment is made in two parts: 90 per cent is paid to traders three days after the bill of lading is issued and the remaining 10 per cent is paid after collection. Once the proceeds of sale are received from overseas, OneTouch deducts 90 per cent automatically and then remits 10 per cent to traders. The initial 90 per cent payments are essentially loans – although traders have difficulty getting loans from banks, this system works because OneTouch holds full transaction data on its database (see Figure 5).

- **Increased collection security:** OneTouch helps operators to check the Letters of Credit terms, thereby providing better business risk control.

- **Faster tax refunds:** The normal export tax refund time is at least three months,[12] but OneTouch can credit operators the 96 per cent tax refund in three days using its own capital.[13] Although China Customs is aiming to reduce the refund time to 20 working days,[14] companies such as OneTouch clearly provide a faster option.

- **Reduced operating costs:** SMEs can spend considerable time and human resources on logistics, clearance and tax refunds, and the smaller the order, the higher the ratio of these costs in the overall costs. One of OneTouch's visions is to incorporate SMEs into the standard import and export service system with lower costs and higher efficiency. Based on such procurements it can reduce logistics costs by 30 per cent.[15]

(iii) Logistics

- **Competitive cos**t: As noted above, through the economies of scale, operators are able to benefit from lower costs on insurance and other logistics services.

- **Crime prevention:** OneTouch uses an 'Internet of Things' (IOT), Location-Based Service (LBS) on its platform to create a more secure trade lane to help operators to combat crime, such as theft.

- **Compliance and trade facilitation:** SMEs improve their supply chain compliance as a result of their service provider's rigorous systems and procedures.

Customs

- **Complete and accurate declaration data**: Declaration data is considered to have a high degree of accuracy, accessible via the OneTouch system that combines financial and logistics information. Customs can use the data pipeline for risk management purposes.

- **Effective and efficient control:** China Customs has a high degree of confidence in the AEO's systems and procedures, enabling it to allocate its resources to unknown traders or high-risk transactions. OneTouch adds value not only on the clearance procedure but also on trader filtering. Using its risk control matrix, it avoids contracts with high-risk clients, which assists Customs in its own management of risk.

- **Anti-terrorism:** Security is a main concern for Customs, and access to platforms such as those operated by OneTouch provides them with additional data to help combat terrorism.

Government

- Through greater reliance on commercial risk control systems, Government direct investment in such systems may be reduced, leading to more effective governance at lower cost.

3.3 Risk control

OneTouch uses a risk control matrix to undertake several aspects of risk management usually performed by Customs. The matrix (Table 2) is composed of three stages (advance control, on control and post control) and four parts (clearance, tax refund, financial and logistics).

4. Relation between data pipeline concept and integrated supply chain companies such as OneTouch

The services of integrated supply chain companies (ISCC) can be viewed as a first step towards the implementation of a full data pipeline, such as that shown in Figure 7. A key function of a data pipeline is that it enables Customs to obtain more accurate data about internationally traded goods. This is important because currently the entry summary declaration (ENS) and the import declaration do not always accurately describe the imported goods. Typically this occurs because the party that makes the declaration, such as the ocean carrier that makes the ENS, is not the party in the supply chain that actually loads the goods into the container (see Hesketh 2009, 2010). Hence, a data pipeline can solve this data inaccuracy problem by using a world-wide IT infrastructure, based on IT innovations such as web services and services-oriented architecture, to enable Customs in the country of destination to obtain import declaration data about goods directly from the seller in the country of origin, or the freight forwarder that filled the containers in that country.

Figure 7: Data pipeline (the green bar is the IT infrastructure)
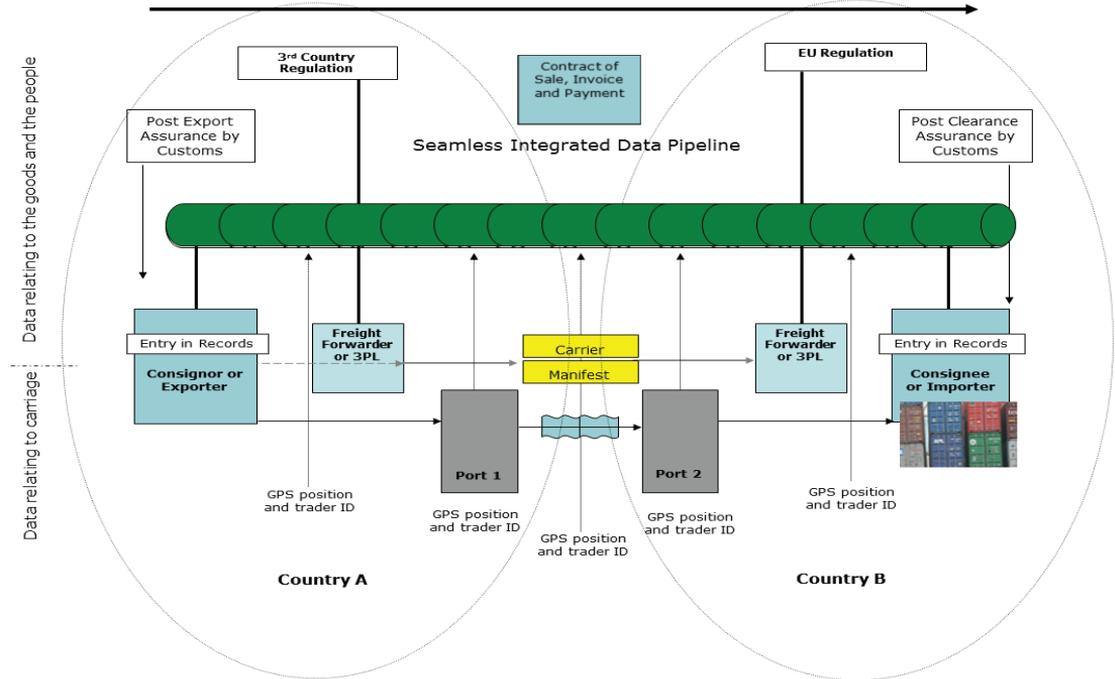
Source: Van Stijn et al. 2011; see also Hesketh 2010; Overbeek et al. 2011; van Stijn et al. 2012.

In the case of a trade lane from China to an EU member state, the ISCC could play a crucial role in enabling such data pipeline visibility for Customs in an EU country as it can provide accurate data from the source party of the supply chain, which is held in their database and able to be shared with Customs. For example, Dutch Customs could obtain both the import declaration and ENS data directly from the ISCC, or indirectly from China Customs via their partnership with the ISCC. To implement a full data pipeline between China and the EU, there must also be a cloud computing environment based on IT technologies, such as web services and service-oriented architectures to transfer the data from the ISCC to Dutch Customs (see Van Stijn et al. 2011). However, this technical aspect is not provided by the ISCC, and hence beyond the scope of this paper.

4.1 ISCC as a landing place for a data pipeline

ISCCs such as OneTouch act as a 'landing place' for a data pipeline, which is typically a community system of a seaport that acts as a national data hub for the exchange of international supply chain data between all parties in the chain.

Since specific customs procedures are quite different between countries, it is more efficient that data pipelines have these landing places both in the country of origin and the country of destination. Typically, port community systems can act as landing places, but a new development is that many industry sectors are developing their own community systems and there are now several community systems that can act as landing places for a data pipeline, depending on the type of goods or modality of hinterland transport from the port (road, river, rail transport). For example, the flower growers in the Netherlands are now developing their own community IT system to exchange their supply chain data within their own community of growers and logistics service providers.

Other examples of landing places are the Neutral Logistics Information Platform (NLIP)[16] in the Netherlands, or TradeXchange[17] in Singapore. The detail of these landing places may be quite different (see Table 4), but that is a topic for future research (which is planned for next phase of the study).

Connecting national landing places, such as OneTouch, NLIP and TradeXchange, would be a very efficient way to implement data pipelines in the future, as the key functionality of national landing places for a data pipeline is the sharing of cargo data among all commercial parties and government inspection authorities.

Table 4: The comparison of three types of landing places for a 'data pipeline'

	TradeXchange	NLIP	OneTouch
Developer	Port authority	IDVV	Alibaba
Character	Single window platform	A system platform	A real company
Responsibility	N Information sharing	N Information sharing and main focus on logistics	Y Not only information sharing but also sharing the risk control responsibility with Customs
Cash flow	N	N	Y
Business profit	No direct profit	No direct profit	Profit from both traditional logistics service and supply chain financial service
WAYPOINT	N/A	Stuffing (A container is packed)	OT conducts on-site vendor audit before signing contract (earlier than stuffing)
Data visibility	All parties	All parties	Partially

5. Conclusions

ISCC systems and controls such as those employed by OneTouch provide a number of benefits for both industry and government: Since the money flow and logistics flow are under the control of the ISCC, its systems provide a reliable basis for ensuring customs compliance and managing associated risks. Also, due to an ISCC's approach to shared commercial responsibility, the need for Customs to check all SMEs individually is reduced, particularly where an ISCC's risk controls include checking a trader's legitimacy before accepting them as a client.

Further, since an ISCC such as OneTouch can handle both integrated logistics services and financial issues such as collections, tax refunds and loans, it is likely to provide an excellent basis for developing an international data pipeline.

Further, as an ISCC can generate revenues not only from the traditional logistics services but also from supply chain financial services including loans for SMEs, this profit-driven mode is likely to see significant growth.

Importantly, the systems and controls of ISCCs such as OneTouch are able to reduce the burden of SME risk management for Customs, particularly as they share the commercial liability with the individual traders. The use of ISCCs by SMEs results in a more compliant supply chain and hence more efficient and effective clearance arrangements. In summary, the commercial methods adopted by ISCCs which serve to facilitate the management of risk may lead to a new approach to customs control.

Associated with this model are, however, a number of potential risks. A potential risk is related to how much trust Customs should place in a company like OneTouch. Perhaps random checks or some other form of verification would be a reasonable method to mitigate such risk. Linked to this is the need to ensure the maintenance of quality services, data and reporting which to a great extent relies on the expertise of the company's employees.

Another potential risk is the development of a monopoly. However, this is unlikely as several companies similar to OneTouch have now been established in China. Also, given that ISCCs hold client data which in turn may be accessed by Customs, a risk to Customs, ISCCs and traders alike is the possibility of leakage of client data to competitors, with the associated negative commercial impacts.

In future research we plan to collect more quantitative data on the cost savings and profits of supply chain compliance based on ISCC companies, and study how it can be combined with IT innovation for inter-continental transfer of goods data in the supply chain such that parties in other countries can benefit from its accuracy.

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Notes

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