Customs supervision on e-commerce: unlocking the potential of online marketplaces

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Executive Summary

Over the past decade e-commerce trade has increased significantly and predictions are that this trend will only continue in the coming years. This exponential growth has created a situation where virtually everyone can be a buyer or a seller. This stands in great contrast with traditional, mainly containerized, trade where most of the volumes are shipped in large quantities between a limited number of sellers and buyers. Consequently, the current enforcement approach of trying to maximize the number of Authorized Economic Operators and trusted trade lanes cannot simply be transferred to e-commerce.

The legislative frameworks that govern and supervise trade are 20th century rules which are still mainly focused on containers rather than small e-commerce packages. Yet, customs administrations around the globe are being flooded with parcels, while often little accurate data is available. Consequently, customs supervision on e-commerce is very labour-intensive and revenue is sometimes lost. Recognizing this issue, international organisations like the World Trade Organization, the World Customs Organization, the Organization for Economic Cooperation and Development, etc. have started debating how this supervision could be improved and how this business model could be organized more efficiently for both trades and governments.

During these discussions, different collection models are often raised as alternative approaches to address the challenges surrounding e-commerce supervision. Nevertheless, all these suggested models share the characteristic that they focus on one of the parties in the logistic chain and give that supply chain actor the full responsibility for the correctness of all the data elements needed for the customs declaration of the parcel. This means that in every scenario somebody is asked for information that he/she does not possess and has to take the legal responsibility for the correctness of this data.

Therefore, this thesis intends to answer the following research question: Which supervision model would allow customs to improve their control over e-commerce without disrupting commercial stakeholders' business models? The research methodology used is design science. As the challenges surrounding e-commerce are numerous, the scope of this thesis is narrowed down to valuation issues. Specifically, the problem of undervaluation is studied in more detail, as well as problems concerning valuation in the fulfilment business model.

The basis for the proposed solution is found in data pipeline theory and technology. The idea of data pipelines was conceived because of the observation that supply chain actors are currently forced to make legally binding declarations about shipments they hardly have any detailed information about. In many different economic sectors, we see that increasing complexity leads to increasing specialization. This is not different in logistics. Consequently, more actors are involved in the supply chain and information becomes more fragmented. A data pipeline addresses this issue by creating a platform for advanced data-sharing, where all supply chain actors only have to provide the information they possess. At the same time, everybody remains owner of its own data and has control over which other participants in the pipeline have access to this data. These other parties can be commercial stakeholders, but also governmental stakeholders like customs administrations. Through a customs dashboard, customs administrations can access advanced data from the source. This increases the quality of the information provided significantly and can help to set up so-called trusted trade lanes or green lanes. In return for this transparency, commercial stakeholders' supply chains become more predictable as preclearance is possible and no time is lost on requests for additional or more accurate information.

Data pipelines, however, are currently mainly tested in a maritime environment. It can build on networks of Authorized Economic Operators who frequently ship the same goods in large quantities.

The parties involved in these chains are often the same. E-commerce chains are fundamentally different as the largest share are one time sales in small quantities. Also, virtually every private person can become a seller or buyer, whereas "traditional" trade focusses on economic operators.

Therefore, data pipeline solutions cannot just be transferred to e-commerce as it is practically impossible to connect all the sellers and buyers. For that reason, the solution proposed in this thesis focuses on a common denominator during online transactions which does not exist in "traditional" trade: the marketplace provider. This party is not involved in the logistic process, but is a node that connects sellers and buyers around the globe and has access to all the relevant commercial information.

However, rather than putting all responsibility with this one party as is currently the case in the different collection models that dominate the debate, this thesis puts forward a hybrid approach by proposing an e-commerce variant of data pipelines. In this solution, the marketplace provider is responsible for providing commercial data like the description of the goods and the value for example, whereas the carriers are only responsible for the logistical data. Similar to what happens with regular data pipelines, data accuracy and predictability of the supply chain will increase. At the same time, consumers will have less unpleasant surprises like delivery delays or additional clearance costs. This can only work to the benefit of the reputation of e-commerce and in this way contributes to the promotion of the marketplaces' business model. Customs administrations will be able to perform an automated pre-arrival analysis. In this way, resources become available to focus on a smaller portion of parcels who are shipped outside the data pipelines. Thus, an e-commerce data pipeline would allow to create a situation in which everyone benefits.

Recommendations for future research would include the management of returns, which is a typical feature of online sales and would constitute a new addition to data pipelines. Furthermore, the aspect of non-fiscal measures could be further elaborated as this is only very briefly touched upon in this study. In this way, a layered control approach could be formulated differentiating trusted trade lanes in the pipeline, little known traders in the pipeline, and shipments outside the pipeline.

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1. Introduction

We live in an ever more digital world. In 2016, the share of the world's population having access to internet surpassed 50% for the first time in history. In Europe, almost three quarters of the population has online access. This digitization has affected the way we consume and the way we shop. Purchasing online allows consumers to have certain goods quicker, often cheaper, without even having to walk out to the door to go out to a store. Therefore, it is no surprise that global e-commerce sales are booming exponentially. In 2016, more than 2 trillion USD was spent online, representing 8,6% of global retail sales. By 2019, e-commerce is expected to represent more than 12,5% of retail sales.

Unsurprisingly, we observe a similar trend in the European Union. E-commerce sales increase annually with around 15% and are predicted to surpass 600 billion euro in 2017. In 2014, Ecommerce Europe estimated that e-commerce accounted for 2,45% of the EU's GDP and expected this to have doubled by 2016 and even tripled by 2020.

The increasing growth in online sales have created a trade environment where almost everybody can be a global seller and/or a global buyer. This stands in great contrast with traditional, mainly containerized, trade where most of the volumes are shipped in large quantities between a limited number of sellers and buyers.

Nevertheless, the legislative frameworks that govern and supervise trade are 20th century rules which are still focused on containers rather than small packages. Where customs administrations are investing a lot to maximize the volumes shipped via trusted traders (Authorized Economic Operators), the number of transactions involving unknown sellers and buyers is also growing due to the increase in e-trade. This means that alternative supervision models would need to be considered that would allow customs administrations around the globe to manage the huge amounts of parcels coming in everyday while not hindering the expedited deliveries which are at the very centre of the e-commerce business model.

In this respect, already many international organizations like the Organisation for Economic Cooperation and Development (OECD), the World Trade Organisation (WTO) and the World Customs Organisation (WCO) are addressing this issue, recognizing the huge challenges that it poses for many different stakeholders. The WCO, for example, has made a categorization of the issues at hand to "slice the elephant" called e-commerce. Four main priority areas were identified, each containing their own subareas:

I. Trade Facilitation and Simplification of Procedures	II. Safety and Security
o Definitions	o Product safety
o Legislation	o Illicit trade
o Automated systems – Single Window (OGAs)	o Quarantine/biosecurity
o Exchange of advance electronic data *(interoperability, minimum data sets,data quality, data privacy)*	o Dark web/net
	o Cyber security
	o Illicit Financial Flows – tracking financial trails
o Trusted Trader/AEO programme for e-vendors marketplaces and intermediaries –enhanced facilitation	o Cooperation and information exchange between Customs administrations
o Framework /guidelines/standards – harmonization and support to MSMEs	o Smuggling of highvalue items and environmentally sensitive goods
o Return/refund (drawback) processes	o Non-intrusive inspection (NII) technologies
o Implementation and review/update of WCO Immediate Release Guidelines and other related tools	o Review/update of relevant tools
	o Case studies
III. Revenue Collection	**IV. Measurement and Analysis**
o De minimis	o Big Data
o Simplified entry threshold	o Stocktake and analysis of work currently being undertaken by international bodies
o Classification, valuation, origin issues	o Research and analysis of various e-commerce business models – case studies
o HS Navigator, integrated tariff database	o Measuring ecommerce flows and economic benefits
o Transactional approach vs account based approach	o Capacity Building, awareness, and education – implementation support
o Alternate models of revenue collection (including impact analysis on the industry and government)	
o Fees and charges	
o Cooperation amongst authorities (Customs and Tax)	

Table 1. Matrix of e-commerce challenges (WCO 2017)

This schematic overview illustrates the enormous complexity and multitude of dimensions which come at hand when addressing e-commerce. As it is impossible to go into every one of these issues in this thesis, I will focus my work around the problem of revenue collection. Specifically, I will zoom into the problem of undervaluation and the difficulties surrounding customs valuation in the case of fulfilment warehousing. As we will see, both of these are mainly due to a lack (of availability) of accurate data. Through focussing on these two issues I will try to answer the following research question: Which supervision model would allow customs to improve their control over e-commerce without disrupting commercial stakeholders' business models?

In what follows I will first discuss these two problems in more detail. Then, in chapter 3, I will go into design science, which is the methodology used in this study to address the research question. After that, I will describe three collection models which are often raised as interchangeable alternatives in e-commerce debates: the buyer collection model, the intermediary collection model and the vendor collection model. In that chapter I will also briefly touch upon the current state of play and the direction in which the debate currently seems to be moving. Finally, I will make a case against the traditional distinction between these models presenting a hybrid, collaborative solution which I feel could facilitate revenue collection.

2. Problem definition

As described above, the huge volumes of e-commerce crossing our borders everyday cause some difficulties for governments concerning revenue collection. An important issue in this respect is the phenomenon of undervaluation. In many countries and/or customs unions *de minimis* thresholds are put in place which allow goods to be entered into free circulation without the payment of customs duties or taxes. In the EU, currently the threshold for VAT is fixed at 22 Euro and for customs duties at 150 Euro. This means that upon importation three situations can occur, as represented in the picture below by the blue lines.
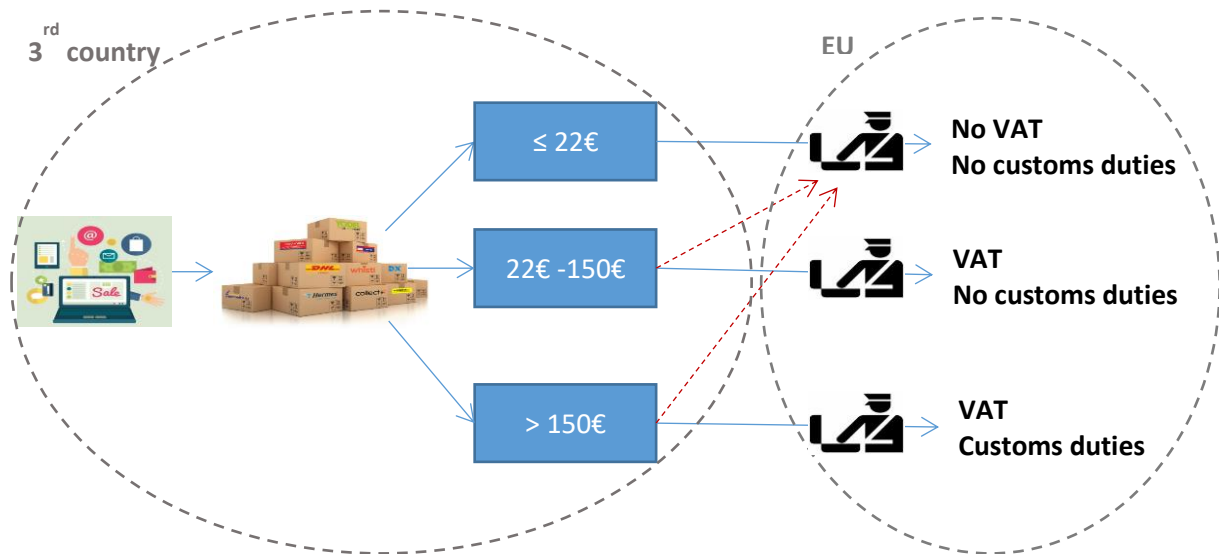

Figure 1. alternative scenarios upon importation in the EU

In practice, however, customs administrations are faced with widespread attempts of undervaluation to avoid the payment of taxes and duties (represented by the red arrows). If we consider for example a parcel with a customs value[1] of 30 euros, the temptation to state 22 Euro on the parcel is often big. Not only because the VAT would amount to 6,30 Euro (I use the Belgian example where the standard VAT rate is 21%), but also because postal services and couriers charge costs for performing the customs formalities. For example, Bpost (the Belgian postal operator) charges 15 Euro for parcels between 22 and 150 Euro, and 30 euro for parcels over the 150 euro threshold. This means that the costs for clearing a 30 euro parcel rise up to 21,30 euro for the consumer or more than 70 per cent of the value of the parcel. As customs are being flooded with parcels, there is a fair chance that this might not be spotted, so people seem willing to take the risk.

What is even more, certain websites even offer a kind of "all-in service" promising to pay the customs fine in case a parcel gets stopped. This indicates that undervaluation for some is a standard practice and that they consider the potential profit bigger than the losses. Unfortunately, currently there is no way to know when a parcel arrives from which website it was purchased. This means there is also no possibility to make a diversified risk management approach based or to reward compliant vendors or shippers who state the correct value. As there is no diversification, marketplace providers like Amazon, E-bay, Alibaba, etc. are not incentivised to play a role in this collection process. I believe they could be

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[1] It is important to keep in mind that the customs value corresponds to the CIF incoterm, meaning that freight costs until the EU border need to be included.

interested if they also see a benefit for their business. In chapter 5, I will describe how this could be achieved.

On top of that vendors often provide vague or misleading goods descriptions, the most striking example being "gift"[2]. This complicates the customs work even further as it hinders classification of the goods and, with that, the determination of the applicable duty rate. It goes without saying that this also impacts the safety & security work of customs, even though we will not go into this topic in this thesis.

The current situation does not merely create revenue loss for governments but also endangers the level playing field between local businesses and online vendors. In this respect, the OECD rightly stated in a 2015 report on the challenges of the digital economy that:

> *The development of digital technologies has the potential to enable economic actors to operate in ways that avoid, remove, or significantly reduce, their tax liability within these bases. This may increase the pressure on a smaller number of taxpayers to compensate for the related loss of revenues. It also highlights the importance of designing corporate income and consumption tax systems that promote growth and investment, while reducing inequality and establishing a level playing field among economic actors.* (OECD 2015, p. 98)

This statement highlights why this situation should be of concern to every individual in society. Taxes pay for public services and social security and if revenue is lost on one end, policy makers might be forced to compensate this loss by increasing the burden on a different group and/or market segment.

A second problem connected to revenue collection I want to highlight is the difficulty of customs valuation caused by the use of the fulfilment business model adopted by some marketplace providers. In this model, the idea is that vendors bring their goods into free circulation and store them in the warehouse of one of these providors before a sale has taken place. In this way sellers can keep their stock closer to their potential clients, hereby reducing delivery times.

As just-in-time and same-day delivery become more and more important, this model is gaining popularity. For example, Amazon launched *Fulfillment By Amazon* in 2006 and states on its website that "sellers keep joining FBA—in 2014, the number of sellers on Amazon adopting FBA to help scale their businesses grew more than 65% year-over-year worldwide. FBA units shipped worldwide grew more than 50% year-over-year during the 2014 holiday season"[3].

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[2] The description "gift" is probably so often abused because C2C shipments without any commercial character enjoy a higher *de minimis* of 45€ in the EU

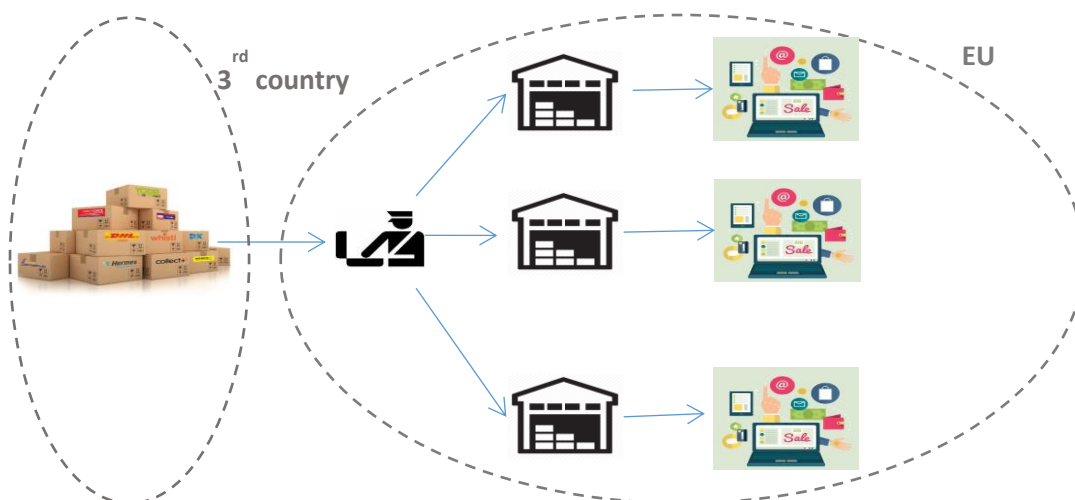[3] Source: https://www.amazon.com/p/feature/pxekbkm47y7c9fd

Figure 2. Fulfilment business model

Nevertheless, as the sale takes place after the goods are brought into free circulation, the customs value cannot be determined by applying the first method of valuation, namely the transactional value. Because in most cases declarants have little information on identical or similar goods, the subsequent methods of the WTO valuation Agreement[4] usually do not provide a solution. Therefore, customs administrations are very likely to have to apply the last method, the so-called 'fall-back method'. This means that customs should apply "reasonable means consistent with the principles and general provisions of the Agreement, Article VII GATT and on the basis of available data" in order to determine the customs value of a product.

It goes without saying that both for customs and declarants this is not an easy situation. Declarants can only work with the information they receive from the vendor or the shipper. Customs administrations hardly have any way of verifying if the price mentioned is correct. The only way would be to go online and try to find the same product, but this is a very labour-intensive process. On top of that, it is nearly impossible to take into account promotions or varying prices between websites or sellers for the same product. In chapter 5, I will explain how the proposed solution for undervaluation could also be applied to remedy this situation. It intends to answer to the definition of "reasonable means".

The taxation challenges posed by e-commerce are not new. Already in their 2001 report "Taxation and Electronic Commerce, Implementing the Ottawa Convention Framework Conditions" the OECD stated that:

> *Electronic commerce has enormous potential to change the way we work, play and organise our lives. It is already changing the ways in which multinational enterprises (MNEs) operate – making globalisation a reality – and it has enabled consumers and small enterprises to operate and shop beyond their national boundaries.*

> *If this potential is to be fully realised we must provide a Taxation Framework which provides certainty, fairness, neutrality and avoids putting in place new tax obstacles to the development*

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[4] The WTO Valuation Customs Valuation Agreement prescribes the following valuation methods to be applied in the prescribed hierarchical order: transaction value, transaction value of identical goods, transaction value of similar goods, deductive method, computed method, fall-back method

of this new form of doing business. At the same time this Framework must ensure that taxpayers pay the right amount of tax, in the right jurisdictions and at the right time.
(OECD 2001, p. 3)

Unfortunately, we see that 16 years later, many countries are still struggling that can achieve just that. The work in this study is focussed around the research question "Which supervision model would allow customs to improve their control over e-commerce without disrupting commercial stakeholders' business models?". This thesis does not intend provide an answer to all the problems connected to e-commerce, as we have seen in table 1 how diverse the challenges can be. Nevertheless, the ambition is to put forward some elements and ways of working which could already alleviate the burden and facilitate the collection process without creating additional obstacles for international trade. To sum up, in the table below you can find a list of characteristics of the current situation which I feel are problematic and how they would need to be adapted in future solutions.

AS IS	TO BE
Marketplace provider plays no role in customs clearance	**Include marketplace provider** in customs clearance process: information about contents and value
The express carrier or postal operator often has **little detailed information about contents** (so also Safety & Security implications) or value	**Sharing of data along the supply chain**
Because of poor goods description and value statements **a lot of physical checks** are required	**System-based approach**[5]
consignor and consignee are often unknown, the moment of **collection is embedded** in the delivery process[6]	Allows for **decoupling of revenue collection** and delivery process
Hardly any opportunities to establish "green lanes" because of **too many unknowns**	Establish e-commerce **green lanes**[7] through preclearance

Table 2. Main differences between AS IS and TO BE situation

Before going into this potential solution, I will first briefly go into the research methodology applied in this thesis, i.e. design science. After that I will also describe how the debate around revenue collection is usually structured in chapter 4.

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[5] System based approach is a horizontal supervision model. The focus is on auditing and monitoring the IT systems of an enterprise to make sure the information provided by these systems is reliable and secured against tampering rather than checking every individual shipment/declaration.

[6] This statement refers to the fact that current collection models focus solely on one of the parties in the supply chain. In what follows, I will explain why in the case of e-commerce this is suboptimal, as a lot of information is in the hands of the marketplace provider, who is not involved in the supply chain. Of course, depending on the business model, the same company offering the marketplace might also offer logistics services and assume the role of a carrier and/or 3PL, but it is not always the case.

[7] 'Green lanes' is a term used to depict trusted supply chains, usually because a chain of trusted traders (AEOs) is established and their information is considered reliable. In the e-commerce green lanes described in this thesis, these lanes are rather based on trusted data sources allowing for a preclearance. In this way upon arrival, the goods can immediately enter in the green channel.

3. Research Methodology: design science

As the ambition of this thesis is to come up with a new, practical and innovative solution for an existing problem, the methodology applied is design science. Design science opposes itself to behavioural science. Where the latter is aimed at explaining or predicting human or organizational behaviour, the former is focused on creating a new artefact to solve organizational problems. Hevner et al. (2004) have formulated a framework that explain how these two research methods can be applied in information systems research. Where behavioural science consists of a develop-justify cycle, design science is characterized by a build-evaluate cycle. The "justify" and "evaluate" phases are meant to provide the necessary feedback to make continuous improvements to the artefact.
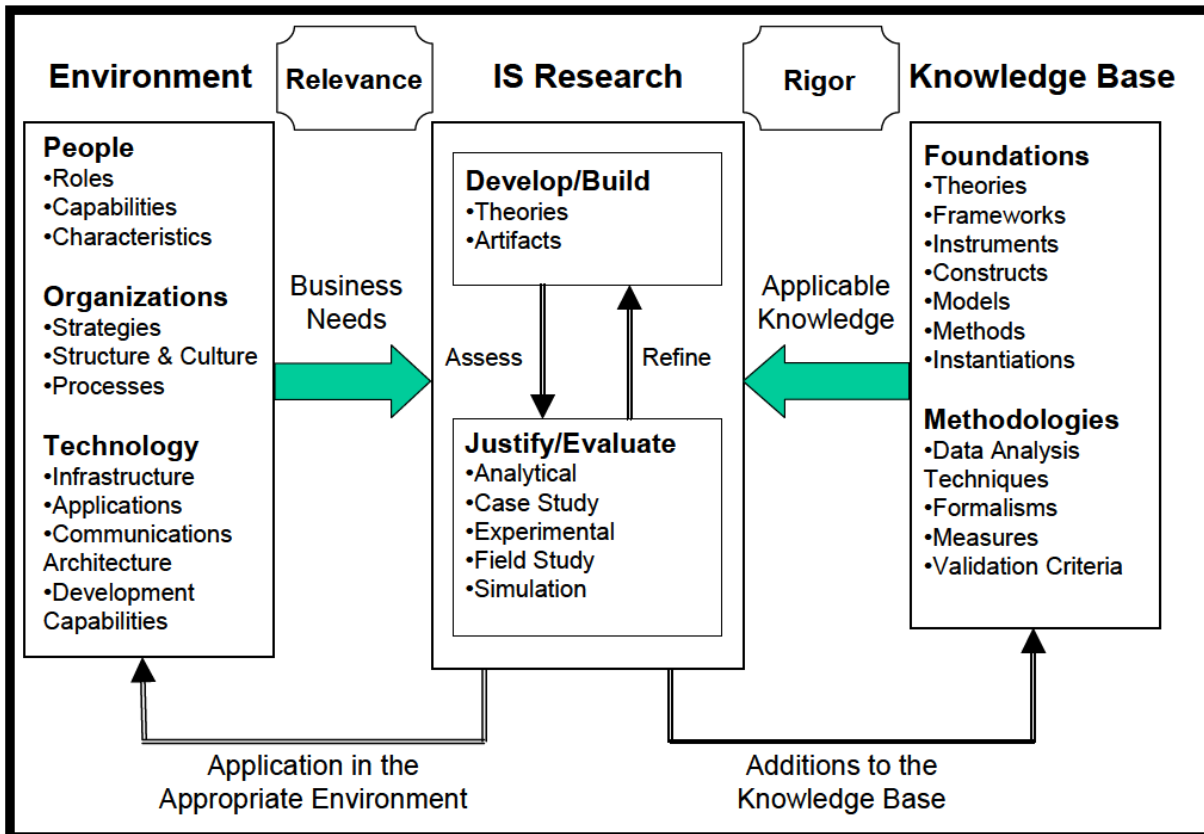

Figure 3. Information Systems Research Framework (Hevner et al. 2004)

On the left of figure 3, we see an environment, made up of people, organizations and available technology. In this thesis, the crucial organizations are customs authorities and marketplace providers. Other partiess involved are e-vendors, e-buyers and (express) carriers. The technology that will be applied are existing IT solutions, yet applied in a different context (cf. infra).

The knowledge base which will be applied to build a new artefact is data pipeline theory, which will be described in chapter 5.1. The eventual artefact which is suggested is an e-commerce variant of a data pipeline. Because of time constraints and the complexity of this solution (particularly in terms of willingness to set up such a pipeline with all parties involved), the evaluation of the proposed solution was limited to validation by IT experts (cf. infra) and, indirectly, through conversations with different stakeholders on international fora on e-commerce. A full implementation allowing feedback to improve the artefact was not possible within the limited time frame.

Within design science, Hevner et al. distinguish between routine design, where existing knowledge (typically best practices) is applied to a problem, and design-science research, which "addresses

unsolved problems in unique or innovative ways or solved problems in more effective and efficient ways" (Hevner et al. 2004, p. 81). Nevertheless, I would argue that this thesis has characteristics of both. The concept of a data pipeline exists and has already been tested, therefore it is not completely new. Yet, as I will explain in what follows, it is typically applied to more traditional trade lanes, involving the same (big) companies shipping large volumes. The solution described in this work, takes this existing knowledge out of its traditional boundary, applying it on a new environment. In that sense, I feel it also has a characteristic of design-science research.

4. Traditional collection models

In order to deal with the challenge of revenue collection in the ever-increasing e-commerce market, we see that the debate on potential solutions is traditionally structured around three collection models. Already in its 2005 *Electronic Commerce: Facilitating Collection of Consumption Taxes on Business-to-Consumer Cross-Border E-Commerce Transactions* rapport the OECD stated that "there are essentially three options for cross-border business-to-consumer (B2C) supplies":

- Collect directly from the consumer
- Collect directly from the non-resident supplier
- Collect from an intermediary acting on behalf of the supplier

I tend to agree with them, although I do not fully agree with their specification "on behalf of the supplier". In a footnote they explain that:

> *This report does not view the use of intermediaries acting on behalf of consumers as a realistic current option. All references to intermediaries are therefore related to those acting on behalf of the non-resident supplier. This is not to say that a model based on intermediaries acting on behalf of consumers will not emerge over time, but only that at the time of writing, no such model has emerged.* (OECD 2005, p. 6)

I am a bit surprised that they suggest that currently intermediaries do not collect on behalf of consumers. In my view, in many countries today this is exactly what happens frequently upon importation of e-commerce goods today. When goods arrive at the Bpost distribution centre, for example, in principle it is the customer who has the responsibility to declare the goods to customs. As hardly any private consumer has sufficient customs knowledge to perform this declaration, Bpost will in almost all cases act on their behalf as the intermediary.

A possible explanation might be that this statement stems from the idea that in "traditional commerce" VAT is paid by the buyer to the seller who will forward the money to the government. However, import VAT and customs duties are paid by the one who imports the goods, in this case the buyer or the intermediary acting on his behalf. Therefore, I find the statement that no such model has emerged a bit odd. Consequently, in what follows I will discuss the intermediary collection model as a possibility both on behalf of the supplier and the vendor.

4.1. Consumer collection model

This is the simplest form of collection as the one who buys a product immediately pays the due taxes upon release of the goods in free circulation. It is easy for authorities to identify the person who owes taxes and to obtain an invoice or proof of payment. Consequently, there are no issues regarding jurisdiction if tax authorities need to apply measures or want to impose payment. Furthermore, this model does not impose additional burden on any intermediaries, nor the third-country vendor. Consequently, there are no additional costs for the consumer with relation to the import formalities and the clearance procedure.

Of course, this model also has some disadvantages. The biggest one is that individual consumers often have very little knowledge about customs formalities and are therefore not capable of lodging a customs declaration themselves. Therefore, we see currently that expeditors, brokers or other service providers in most cases lodge the declaration on behalf of the consumer (cf. supra).

Another disadvantage is the fact that customs authorities under this model would need to deal with a huge number of importers (i.e. every consumer that buys online) in comparison to a reduced set of intermediaries. As these are individuals, customs have no knowledge on these clients. They are not eligible for AEO status, which makes it hard to establish trusted trade lanes. Because of that, it is harder to establish a system-based approach and focus will automatically need to be on transactional controls. It goes without saying that this is very resource – and time consuming, especially considering the increasing volumes in e-commerce.

Advantages	Disadvantages
- Easy to identify who is liable	- Little knowledge on customs formalities
- Direct access to transaction data	- Huge number of unknown "clients" for customs
- Taxpayer in the same jurisdiction	
- No additional burden on third parties	- Little potential to set up trusted trade lanes
- No additional clearance costs	- More focus on transactional controls

Table 3. Pros and cons of consumer collection model

4.2. Vendor collection model

This model shares with the previous one that taxes are collected from one of the protagonists of the sale. The vendor, just like the buyer, has access to all the relevant information regarding the sale (product, price, final destination, etc.). Therefore, this model aligns well with the principle of capturing "data from the source" (cf. infra). They also have in common that no additional obligations are imposed on third parties.

However, an important difference is that under this model, tax would need to be collected from a party in a different jurisdiction. Evidently, this makes it harder for authorities to enforce. I believe this is particularly problematic when the vendor is a private person having a small online business. Because, just like everyone is a potential importer under e-commerce, everyone is also a potential vendor. So, also under this model, authorities are faced with a huge number of unknown clients. Even though the OECD seems to prefer this model, they recognize this limitation. In their 2015 final report on *Addressing the Challenges of the Digital Economy - Action 1*, they rightly state that:

> *The OECD's E-commerce Guidelines (OECD, 2003) therefore recommend a mechanism that requires the non-resident supplier to register, collect and remit VAT according to the rules of the jurisdiction in which the consumer is resident. This results in the correct amount of VAT being paid in the jurisdiction of consumption. <u>This approach, however, is dependent on the non-resident supplier complying with the requirement to register, collect and remit the VAT</u>. In other words, if taxing rights are allocated to the jurisdiction of consumer residence without implementing a suitable mechanism to collect the tax in this jurisdiction, it is unlikely that VAT would be paid.*

> *The example above <u>illustrates how domestic suppliers of competing services could face potential competitive pressures from non-resident suppliers</u>. Domestic suppliers are required to collect and remit VAT on their supplies of services and intangibles to their domestic*

consumers while the non-resident supplier, depending on the scenario, could structure its affairs so that it collects and remits no or an inappropriately low amount of tax.[8]

This passage deals with services and intangibles, but could apply just as well to goods. Even though the catch rate of tangibles is higher since a parcel physically needs to cross a border while intangibles do not, we already mentioned before that some vendors are confident enough to not comply hoping that their parcels get through customs unnoticed in the "e-commerce tsunami".

Nevertheless, in contrary to the consumer collection model, there might be a few big vendors who will be responsible for a big portion of the sales. If customs administrations could identify these and collaborate with them, it could be possible to set up some trusted trade lanes.

An additional advantage of vendor collection I see, is that preclearance could be possible if the declaration is made immediately after the sale before or during the shipment of the goods. It goes without saying that also safety, security and other non-fiscal measures would need to be checked before preclearance is possible. This means that essentially only full preclearance (i.e. not just fiscal) could be set up for known/trusted vendors on the basis of mutual recognition agreements with the country of origin.

Whether this model leads to additional costs for the consumer will depend on the service level the vendor wants to provide. Some might see it as a chance to offer a better service to their clients, while others might charge extra for the clearance formalities.

Advantages	Disadvantages
- Direct access to transaction data - Data from the source - No additional burden on third parties - Potential for preclearance	- Taxpayer in different jurisdiction - Varying degree of knowledge on customs formalities - Huge number of unknown clients - Extra service costs?

Table 4. Pros and cons of vendor collection model

4.3.   Intermediary collection model

Currently, this model is the most used around the world in e-commerce. Many logistics service providers take care of the customs formalities for their clients. Therefore, this model often is synonym for carrier/courier collection model. In discussions, however, also the option of financial intermediaries has been raised sometimes[9]. To me this option does not seem so realistic. While these of course have access to financial information, they lack details on the products themselves. Therefore, it is hardly impossible for them to provide a correct statement of the goods as they never get into contact with the goods. Also for couriers it is not easy to know the exact contents of every parcel they transport. Due to weighing and security scanning they often have a generic idea of the contents (i.e. shoes, clothing, etc.), but this is often not enough to make up a correct customs declaration. Therefore, they often need to work with the information that is provided by others. Considering the large volumes arriving at the same time and the importance of speedy delivery this is a difficult task.

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[8] My underlining
[9] See for example OECD 2001, OECD 2015 and WCO 2017

Nevertheless, a good intermediary can facilitate the customs work considerably. They often have the necessary expertise when it comes to customs legislation, classification of goods, etc.

Advantages	Disadvantages
- Often have in-depth knowledge and experience with customs formalities - Less contact points needed for customs, facilitates dialogue	- No first-hand information on the sale or the description of the goods - Extra cost for the consumer - Huge volumes of declarations that need to be followed-up at the same time by one party

Table 5. Pros and cons of intermediary collection model

In my opinion, an important intermediary is often forgotten, namely the platform owner. Sometimes the platform owner is also the vendor. Depending on the situation, Amazon, e-bay, Alibaba are merely service provider or also the seller of the products on their respective websites. In either case though, they have detailed information of who sells which product to who, and for which price. They possess almost all the crucial information required for customs clearance. Therefore, they will play an important role in the solution proposed in the next chapter.

4.4. Current state of play

As described above, the intermediary collection model is currently the standard in most cases. Depending on the channel used, it are postal services, express couriers or a different service provider who submit the customs declaration on behalf of the buyer. As said, an important disadvantage of this model is the fact that there is no first-hand detailed information on the sale or the description of the goods. This seems to be a universal problem, so it is no surprise to see that international organizations like the OECD, the WTO and the WCO are devoting a lot of attention to this issue. Private sector stakeholders play an important part in these debates as they are also faced with operational difficulties or inconveniences (e.g. incomplete information, delays in clearance, etc.) as a consequence of the current situation. There seems to be a wide consensus that the current situation needs to change. The report of the December 2014 Policy Commission of the WCO, for example, reads:

> *The international delivery of goods purchased online posed huge challenges for Customs, which had to facilitate the cross-border movement of these goods, whilst at the same time ensuring appropriate revenue collection and compliance with national laws and regulations. Goods delivered by postal and express parcel services were especially problematic, and the use of pre-arrival/pre-loading electronic data was being discussed in this context. The growth in B-to-C sales was expected to continue, so the paper by the New Zealand Administration on possible ways forward with e-commerce was particularly timely, as was the Chairperson's emphasis on the importance of IT developments.* (WCO 2015)

However, it seems that the vendor collection model and/or intermediary (on behalf of the vendor) collection model is seen by many as a good way forward. The EU is currently looking at the possibility expanding the system of the Mini One-Stop-Shop (MOSS), which was put in place to allow non-Union vendors to supply services in the EU, to also include goods sold online. Under this system, any vendor can register in one EU member state and submit all its declarations for any member state there. The

EU member states will then take care of redistributing the collected amounts[10]. In a press release of 25 September 2015 by the European Commission we read:

> *The Commission will propose simplification measures for small business including an appropriate threshold which can address the problems without causing further distortions to the single market or compliance challenges for tax administrations. Specifically, the Commission will propose reducing the administrative burden on businesses arising from different VAT regimes including:*
>
> - *extending the current single electronic registration and payment mechanism to cover the sale of tangible goods;*
>
> *[...]* (EU 2015)

Furthermore, Australia also has been planning to introduce a vendor collection model for GST[11] on online purchases. In practice though, it is a combination of the vendor collection model and intermediary collection model as it also wants platforms like Amazon and E-bay to collect the tax on sales made[12]. I would even say that the biggest focus would be on intermediary collection. Nevertheless, these plans seem to have been postponed[13] and there still seems to be ongoing debate in the media. For example, in an article from *The Guardian* of 19 April 2017 we read:

> *Amazon has attacked the government's plan, saying it is so poorly designed it will create an "inherent disincentive" to comply.*
>
> *It said the government should instead use a so-called "logistics model" to collect GST on online purchases, requiring Australia Post (and express carriers and freight forwarders) to collect GST instead.*
>
> *"Logistics providers already have infrastructure in place to collect information on goods coming into Australia and have well-established processes for GST collection for goods valued at more than $1,000," it says in a submission.*

A bit further however, we see that Australia Post is also not eager to take responsibility for the collection:

> *Australia Post has warned that, if the government adopted Amazon's suggestion, it would be "adversely impacted" by the extra administrative complexity caused by the imposition of additional revenue collection.*
>
> *"Any proposal involving collection of GST under a model that requires collection at the border is likely to render Australia Post mail and parcels business unviable in the current market of continuing and significant decline in mail volumes that have put severe strain on the financial position of the corporation," its submission says.* (Hutchens 2017)

It seems nobody really wants to hold full responsibility and have all the burdens imposed upon them, which one can understand. No matter which way you look at it, each collection model has also its disadvantages and no party in the chain has all the information to be able to submit a full declaration.

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[10] More information on the MOSS can be found on https://taxes.recurly.com/vat/understanding-eu-vat-moss

[11] Goods and services tax (GST) is a broad-based tax of 10% on most goods, services and other items sold or consumed in Australia.

[12] More information on the Australian case can be found on https://www.ecommerceworldwide.com/expert-insights/expert-insights/australia-extends-tax-to-foreign-ecommerce

[13] http://www.vatlive.com/vat-news/australia-may-delay-jul-2017-foreign-gst-e-commerce-overhaul/

Yet all the theories seem to focus on just one stakeholder. All the above models connect revenue collection to the gathering of information and vice versa.

However, I believe that a stable solution can only be found when a collaborative approach is set up along the supply chain. Therefore, in the next chapter, I will propose a hybrid solution which distributes the burdens and does not hold one party fully responsible for all the formalities.

5. Hybrid solution

Already in 1998, the OECD Ministerial Conference in Ottawa underlined 'flexibility' as one of the broad taxation principles that should apply to electronic commerce, alongside neutrality, efficiency, certainty and simplicity, and effectiveness and fairness:

> ***Neutrality***
> *(i) Taxation should seek to be neutral and equitable between forms of electronic commerce and between conventional and electronic forms of commerce. Business decisions should be motivated by economic rather than tax considerations. Taxpayers in similar situations carrying out similar transactions should be subject to similar levels of taxation.*
>
> ***Efficiency***
> *(ii) Compliance costs for taxpayers and administrative costs for the tax authorities should be minimised as far as possible.*
>
> ***Certainty and simplicity***
> *(iii) The tax rules should be clear and simple to understand so that taxpayers can anticipate the tax consequences in advance of a transaction, including knowing when, where and how the tax is to be accounted.*
>
> ***Effectiveness and Fairness***
> *(iv) Taxation should produce the right amount of tax at the right time. The potential for tax evasion and avoidance should be minimised while keeping counter-acting measures proportionate to the risks involved.*
>
> ***Flexibility***
> *(v) The systems for the taxation should be flexible and dynamic to ensure that they keep pace with technological and commercial developments.*
> (OECD 1998, p.4)

While we can argue that the traditional models mentioned above are neutral, (relatively) simple and certain, while at the same time trying to be fair; we could still question the flexibility of those systems, and with that the efficiency and effectiveness of collection. I deliberately stated "trying to be fair", because, if the effectiveness of collection is endangered, so is automatically also the fairness of the whole system.

The European Telecommunications Network Operators' Association (ETNO) also warned the OECD about this in 2015 in their open letter as a response to the initiatives concerning the vendor collection for services via the MOSS (cf. supra):

> *Furthermore, we believe that the enforcement of the destination principle will be incredibly difficult, if not impossible, across the board, with the consequence that a level playing field does not appear achievable via implementation of these guidelines. We therefore have doubts as to whether the 'usual residence' proxy can meet the OECD criteria of neutrality, efficiency, certainty and simplicity, effectiveness, and fairness in practice.* (ETNO 2015)

As already indicated, all the examples mentioned in chapter 4 share the characteristic that the collection of revenue is tied to the collection of information. Regardless of the model, they all seem to hint at one supply chain actor who should provide all the relevant information and fulfil the obligations.

Even when the OECD mentions in its 2015 *Addressing the tax challenges of the digital economy* report that a combination of models is possible (p. 126), it still suggests only one responsible per transaction.

In what follows, I will argue why this does not necessarily need to be the case and how a hybrid solution could be envisaged, providing the desired flexibility while at the same time improving the efficiency and effectiveness of collection. In order to do so, I will first go into some existing research on data sharing and visibility along the supply chain. Then, I will describe how this could be applied in an e-commerce context.

5.1. Data pipeline theory

Unsurprisingly, when we talk about optimization of supply chains and supply chain supervision, we inevitably turn to the potential of technology and advanced data-sharing. There seems to be a wide consensus that these are key factors to optimize the way we deal with e-commerce:

> *However, tax authorities admit that the use of compliance measures is not sufficiently effective and there is room for improvement, such as better use of administrative cooperation between EU Member States and with non-EU countries and further development and use of technological tools.* (Deloitte, 2016)

> *Participants of the sub-group [Trade Facilitation and Simplification of Procedures] highlighted important enablers to keep in mind when developing solutions to facilitate and simplify e-Commerce trade. Those are as follows:*
> *[…]*
> *3. Stakeholders engagement (from beginning to end);*
> *4. Communication / Education;*
> *5. Use of innovative technology;*
> *6. Data from the supply chain*
> *[…]*
> (WCO 2017, p. II/11)

> *There are a number of features that are increasingly prominent in the digital economy and which are potentially relevant from a tax perspective. While these features may not all be present at the same time in any particular business, they increasingly characterise the modern economy. They include:*
> > *[...]*
> > - *Reliance on data, including in particular the use of so-called "big data".*
> > - *Network effects, understood with reference to user participation, integration and synergies.*
> > - *Use of multi-sided business models in which the two sides of the market may be in different jurisdictions.*
> > *[...]*
> (OECD 2015, p. 64-65)

In recent years, a lot of work has been undertaken already to study the potential of so-called data pipelines in supply chains, albeit mostly in the context of maritime traffic. Data pipelines intend to provide an answer to the growing complexity of international trade and supply chains, as we can observe that:

Since the advent of the sea container in the twentieth century, the carrier has entered into a contract of carriage with the shipper concerning goods in a metal box that nobody can see. Outsourcing, consolidating cargo and multi-modal transport chains have allowed the identity of the true seller or consignor to be clouded and contractual terms to be over-complicated. Carriers and importers are being asked to make legal declarations about goods they have never seen and documents containing crucial information can lag three days behind the exported goods. This is all happening while advances in information technology have rapidly outstripped the enthusiasm or willingness of the international trade industry to adapt and keep pace with change. Complexity and mysticism have caused the simple buyer and seller to engage a range of logistics and service providers to handle the processes on their behalf resulting in a lack of visibility of events, costs and assurances. (Van Stijn et al. 2011, p. 4)

A crucial observation in this list is that supply chain actors are currently forced to make legally binding declarations about shipments they hardly have any detailed information about. In many different economic sectors, we see that increasing complexity leads to increasing specialization. This is not different in logistics. Consequently, more actors are involved in the supply chain and information becomes more fragmented.

Furthermore, as more actors will focus on one specific role (or a few specific roles) in the chain, there are increasingly less people who have an overview over the entire chain and (data) requirements at different points in time. An overview of the complexity of global supply chains has been illustrated by Van Oosterhout et al. (2000):
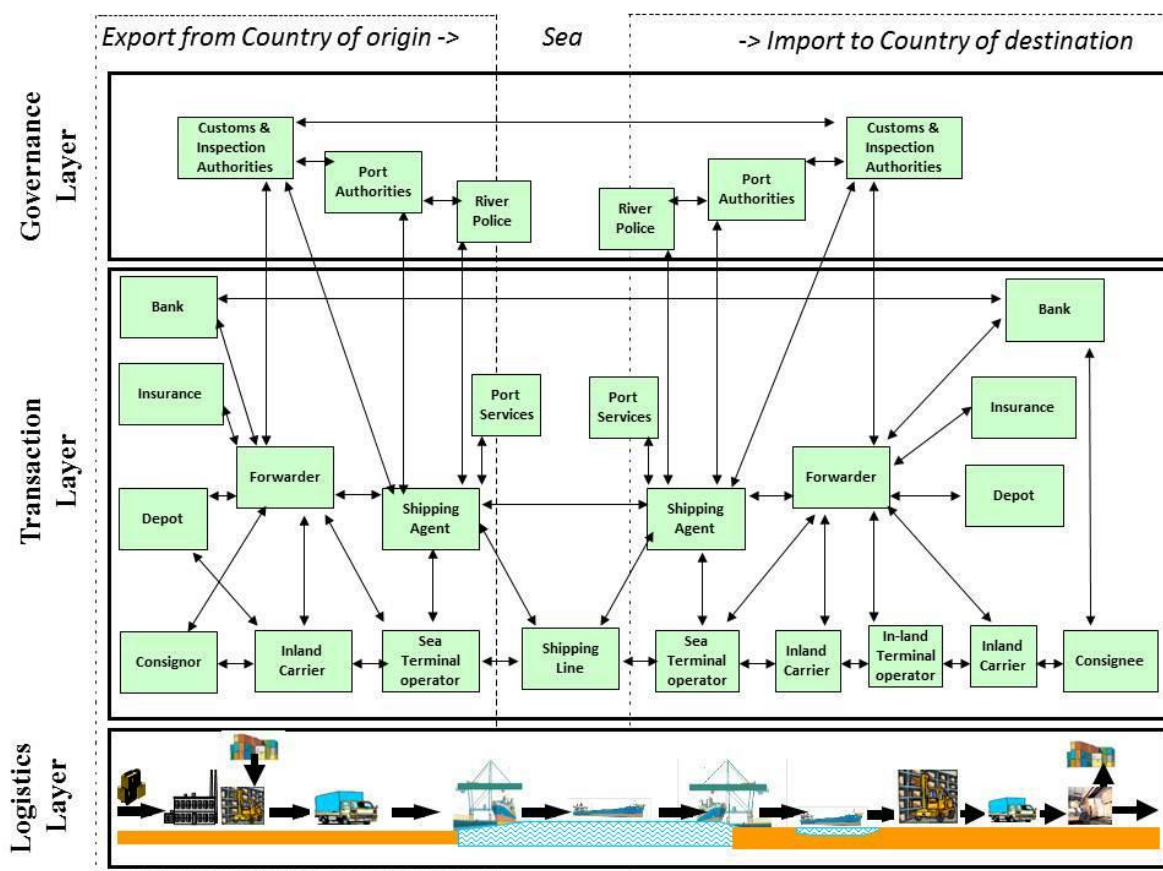

Figure 4. Overview of the global chain (Van Oosterhout et al. 2000)

The figure above gives an idea of the many actors and trade relations involved in a single shipment. Therefore, it should not be a surprise that declarations sometimes are incomplete or contain inaccuracies. There is a clear need for increased visibility.

This need for improved visibility does not stem from governments alone. Also, private sector stakeholders have much to gain. One the most well-known examples of what misdeclaration / misinformation can cause is the explosion on board the MSC Flaminia in July 2012 on its way from Charleston to Antwerp[14]. Because of a discrepancy between the cargo declared and the actual cargo on board, three containers of divinylbenzene – a hazardous chemical – were not stored properly. A similar accident occurred in 2013 when a container of chemicals self-combusted on board the Maersk Kampala[15]. Also in 2015 a similar event took place on board the Caroline Maersk. In the Marine Accident Report of the Danish Maritime Accident Investigation Board regarding that last incident we read:

> *According to the cargo manifest, the contents were described as 'tablet for water pipe'. The manifest also referred to HS Code 440290, which is the Harmonized Commodity Description and Coding System's code for 'wood charcoal'. The IMDG Code states that charcoal is a Class 4.2 cargo, which covers substances liable to spontaneous combustion; however, the cargo of the burning containers had not been declared as dangerous cargo. These facts indicate that the container contents should have been declared as dangerous cargo from the shipper's side, but they were not.*
>
> *Undeclared cargo, i.e. containers with contents different from those declared, is an issue that the operator of the ship was aware of. The scale of container shipping, i.e. the high number of containers transported world-wide, means that manual inspection of each individual container is not feasible due to time and personnel restrictions. This means that, with the exception of reefer containers and containers with declared dangerous cargo, shipping containers are only subjected to sporadic spot-checks with regards to contents and stuffing from the time they leave the shipper until the time they arrive at the recipient.*
>
> (Danish Maritime Accident Investigation Board 2016, p. 16)

Incidents like these do not only hurt carriers as they can lead to a loss of cargo or at the minimum huge delays for containers not damaged. We know that somewhere along the supply chain there must have been a few actors who had the information to prevent this from happening. We can conclude that all the information is already available, yet it is not shared sufficiently. Another risk is that data gets polluted as it gets passed on between different parties in the supply chain. The main reason for this is that there seems to be a lack of accountability throughout the supply chain. For example, the consignor is the one who ships the goods in the supply chain, yet he has hardly any legal accountability in case he makes a poor goods description, thereby affecting the information flow in the entire supply chain. Also some intermediaries might feel reluctant to disclose too much detail for commercial reasons (cf. infra). Therefore, data pipelines can be constructed to capture data from the source and allow access to this information to the parties who need it.

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[14] More information available on http://www.marineinsight.com/case-studies/details-on-the-container-ship-msc-flaminia-accident/
[15] Source: http://www.maersk.com/en/the-maersk-group/about-us/publications/maersk-post/2014-5/heavy-weather-means-risky-business

Nevertheless, we also observe that there are parties along the supply chain who have to gain in the current lack of transparency. Hesketh (2010), for example, observes:

> *If the shipper declares the true value of the goods to the carrier then the freight rates increase significantly because the carrier is then liable for the entire cost in the event of damage or loss. So the shipper reduces the description of the goods and omits the true value on the bill of lading then takes out separate insurance to cover the risk.*

The fact that logistics is not always transparent also creates opportunities for business models, particularly for service providers. Because, the more complex a process appears, the more likely a buyer or seller will turn to a third party to take care of this process from him. Consequently, those parties might be reluctant against introducing platforms and/or projects that would introduce more visibility in the supply chain and reduce the complexity of the whole transportation process. Klievink (2012) also pointed out that even carriers might be reluctant towards more transparency because of increased liability risk:

> *However, some organizations may also see visibility and transparency as a threat to their business operations, or they may even benefit from the fact that it is complex and obscure at the moment. For example, interviewees indicated that some carriers are concerned that more visibility in the supply chain might lead to more liability of damage or loss of the cargo while being transported by them. Currently, if the carrier does not have detailed information about the type of cargo that is in the container this liability is limited per container according to the Hague-Visby and Rotterdam Rules. However, when it can be proven that the carrier knows that a container contains, e.g., valuable goods, the liability in case of loss of the container can increase by a thousand times.* (Klievink et al. 2012, p. 23-24)

Nonetheless, I believe the economic damage from incidents onboard, like the ones described above, are more costly in the long term, also considering the potential damage for their reputation.

In order to leverage as much as possible on the information already available in the supply chain, the piggybacking principle is at the heart of data pipeline theories. This means that rather than coming up with additional data requirements, data is re-used as much as possible by different actors along the supply chain and for different purposes than initially intended. For example, commercial data (e.g. the identity of the seller and the buyer, the sales price, the goods description on the invoice, etc.) could be re-used by carriers, but also by governments for risk assessment and/or revenue collection purposes. This principle implies that every party along the supply chain uploads the information of which he or she is the owner. This was visualized by Hesketh (2010) as follows:
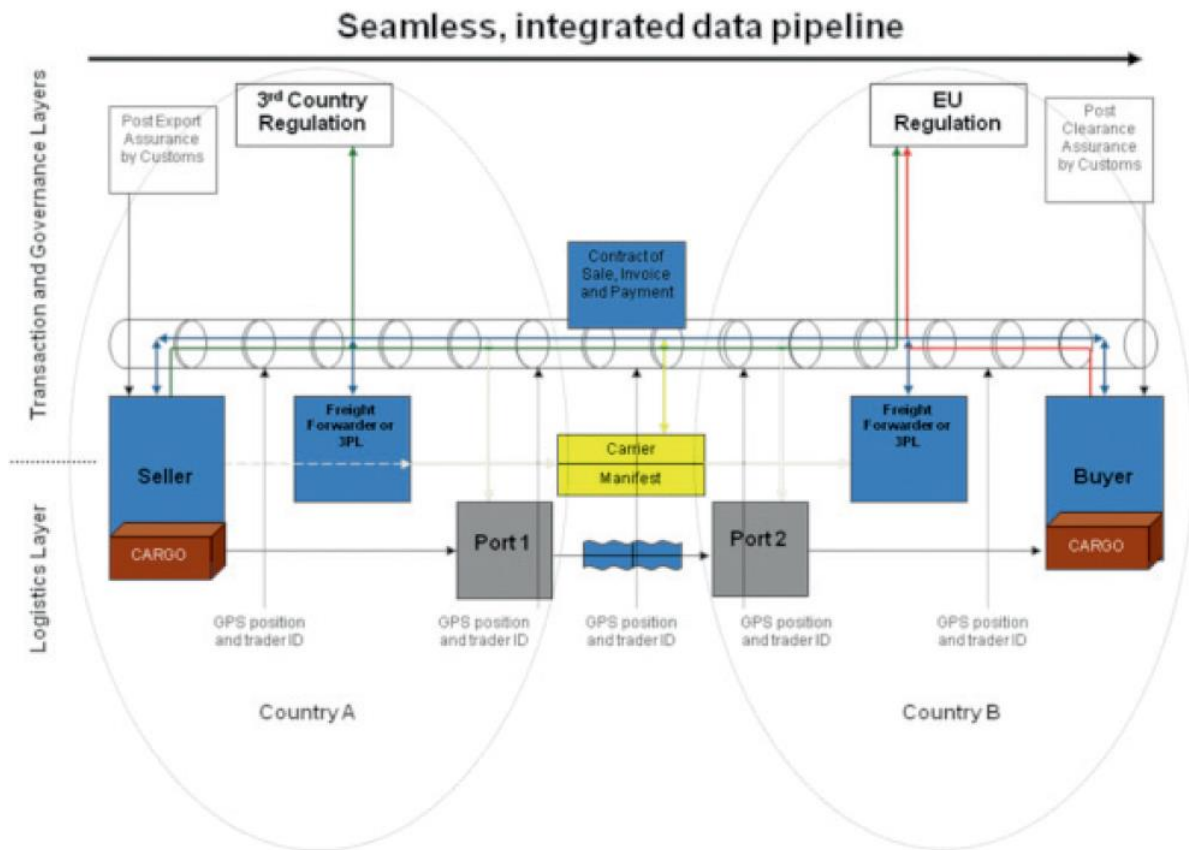
Figure 5. Seamless, integrated data pipeline (Hesketh 2010)

Of course, a delicate issue when engaging in data sharing is data ownership, data privacy and confidentiality. A data pipeline does not mean everyone has unlimited access to all the data in the supply chain. For example, a seller or buyer might have no problem sharing the invoice with customs, but could be reluctant to share it with other (private) parties along the supply chain in order not to disclose its pricing strategy or commercial discounts awarded. Depending on the specific set-up of each supply chain, this could even be different for different data pipelines. Therefore, a data pipeline foresees that each party can determine which other parties along the supply chain can have access to what information. Klievink et al. (2012) provides an example of how data visibility in a data pipeline could be conceived:
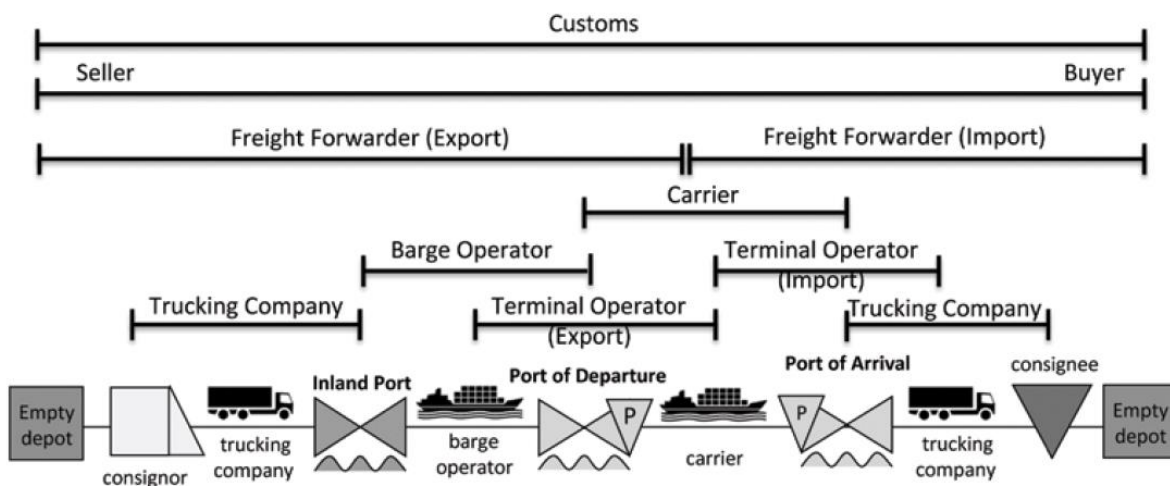

Figure 6. Data visibility for each of the trade lane partners (Klievink et al. 2012)

What is important, is that each of the parties along the supply chain remains the owner of their own data and can control access by any of the other parties involved.

These theories have already been tested in projects like ITAIDE and CASSANDRA, and are currently being put further to practice in various demonstrators of the CORE project. One example concerns a coffee trade lane by Efico from South America to Antwerp (D13.1). The data concerning these shipments are continuously monitored and available in a dashboard for the company. At the same time, customs receive authorization to see relevant data in a customs dashboard, making it possible to monitor this shipment end-to-end. This is conceived as follows:
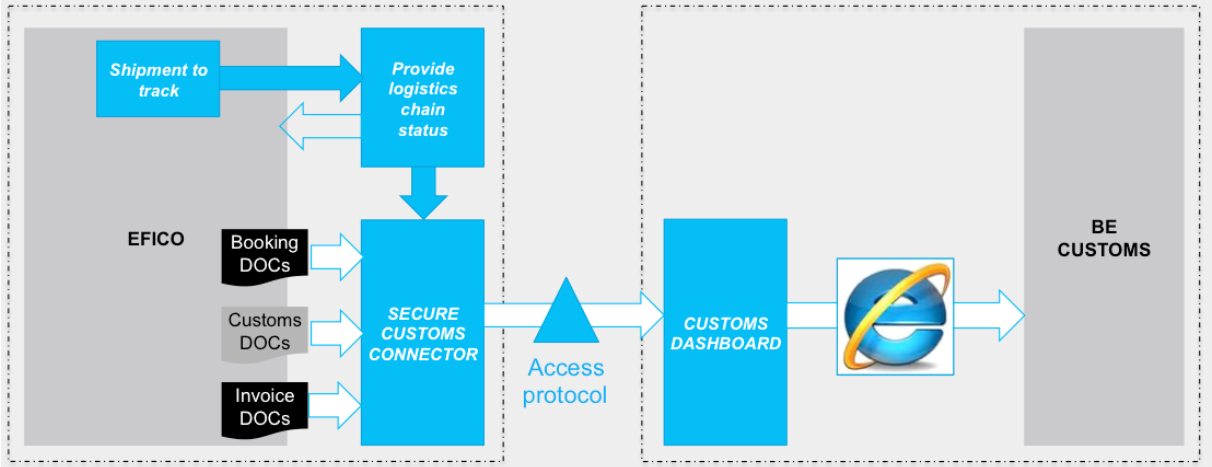

Figure 7. Link between company dashboard and customs dashboard

The customs dashboard includes some intelligence features like an alert which pops up if the container is being opened after it has been sealed with a smart seal. This makes it possible to focus on that particular event and verify if it was another supervision agency in a third country that opened the container or if there rather is a risk of rip on/rip off. Another feature is the singling out of inconsistencies. For example, at various points in the supply chain there is an indication of the weight of the container. If this value varies too much at different points in the supply chain, this is also something that could be of interest to customs. Of course, it could be a simple typo, but it might also very well be possible that somebody hampered with the container. Similar demonstrators are also going on in the UK and the Netherlands, for example with flowers from Kenia. This last demonstrator (D11.2) even includes a mobile application, making it possible for the company to track its shipments and receive alerts via smartphone.

Because of this advanced information, trusted trade lanes can be created providing benefits both to customs and private sector stakeholders. Companies will experience less disruptions of their supply chains. In case of any events or inconsistencies, these can be spotted very early in the logistics process, allowing for optimal planning of any potential controls. For customs, trusted trade lanes are important to optimize the available capacity in times of increasing international trade. By identifying the so-called green lanes, the available means can be focused towards supply chains which are less trusted or where little information is available.

However, so far most demonstrators have focused on "traditional" business-to-business maritime container traffic. In the next section, I will argue how a data pipeline could be set up in an e-commerce environment, in this way creating a hybrid solution compared to the more black-and-white collection models cited in the fourth chapter.

5.2. Application of a data pipeline in an e-commerce environment

As we have seen in the previous chapters, also e-commerce is often characterized by a lack of transparency and unavailability of information. Therefore, it only seems logical that setting up a data pipeline could provide a potential solution. Of course, an important limitation compared to traditional containerized B2B traffic, is that with e-commerce the trade lanes are less stable and usually there is only a one-time delivery for a specific product whereas data pipelines in container traffic are rather proposed as a solution for regular known trade lanes between trusted traders.

As a consequence, we cannot apply the same approach and start from regular trade lanes. This implies we must look for a different stable factor or common denominator. In my opinion, a good option would be the market place providers, for several reasons. First of all, marketplaces provide the forum for online sales. Because of that, they always possess the crucial information surrounding the sale, i.e. they know who sells what to whom and for which price. Secondly, there are a few big players (in the first place Amazon, Alibaba, and E-bay) who control a big portion of the market. By focussing on setting up collaborations with these players, already a big share of e-commerce trade can be shipped under these trusted trade lanes. Finally, I believe there is also a commercial incentive for market places to participate in such data pipelines. By automating the data exchange with the authorities, they provide an additional service to their clients and can guarantee faster delivery. Because they can lodge declarations before arrival of the goods (cf. infra), upon arrival goods will either be immediately released for free circulation or selected for inspection. This will increase the predictability of their deliveries and hence their reputation among online shoppers.

As I will explain in what follows, a data pipeline would also allow the marketplace to clearly display any additional costs that would be owed upon arrival like customs duties or VAT. This would reduce unpleasant surprises for their customers and hence increase customer satisfaction. In this way, people who are now reluctant to buy online because they are not sure what the additional costs would be, might feel more inclined to buy something on their platform if they are sure about the total cost.

So rather than focussing on trusted traders, the focus in e-commerce would rather be on "trusted data sources", as the marketplace is not necessarily involved in the goods flow – this depends on the business model(s) adopted – but always in the information flow. Marketplaces seem like a good starting point in light of their rising popularity in the e-commerce context. Both on a global level with amongst others the "big 3" cited in the previous paragraph, and on a local level with booming websites like Bol.com in the Benelux region for example. According to a study carried out by the Ecommerce foundation, Nyenrode Business University, Adobe, Informatica, Lengow and LiveWords, retailers from all over the world expect that global market places will own 39% of the global online retail market in 2020 (Rund 2015). By involving them, already a significant share of e-commerce would be covered.

For the sake of clarity, I repeat the most important changes that would need to be achieved by setting up data pipelines in e-commerce as mentioned above in chapter 2.

AS IS	TO BE
Marketplace provider plays no role in customs clearance	**Include marketplace** provider in customs clearance process: information about contents and value
The express carrier or postal operator often has little detailed information about contents, so also **S&S implications**, or value	Information about contents allows for a (pre-arrival) **risk analysis-based supervision**
consignor and consignee are unknown, the moment of **collection is embedded** in the delivery process	Allows for **decoupling of revenue collection** and delivery process
Hardly any opportunities to establish "green lanes", a lot of **physical checks** required	Establish e-commerce **green lanes** through preclearance

Table 2. Main differences between AS IS and TO BE situation

5.2.1. Practical implementation

In order to avoid that global marketplaces would need to negotiate separately to set up data pipelines for each different country, it is important that a standard can be agreed. Otherwise the compliance burden op private sector stakeholders will become too big. I believe the right forum to do this would be the World Customs Organization. This could even be developed as a kind of Utility Block, similar to what happens under the Globally Networked Customs concept[16]. This Utility Block could be shaped by making use of the UN/CEFACT[17] standards for logistics and the WCO customs data model. Without standardization, it would become virtually impossible to successfully develop a widely used data pipeline as adaption/connection costs would result too high if not all the parties involved "speak the same language".

In the following paragraphs, I will describe how a generic set-up could look like, regardless of the technical data specifications that would be agreed. I will use Amazon in the example, although in practice it could of course be any marketplace provider.

Identification of goods sold online

Each product offered for sale on Amazon receives a unique identifier, the so-called Amazon Standard Identification Number (ASIN). This could be a useful tool for customs, as every product in the EU needs to be classified following the Combined Nomenclature, based on the Harmonized System. When a data pipeline is set up, ASIN numbers could be linked to their HS codes (for global applicability), or even their Combined Nomenclature[18] (CN) codes. This would allow automated classification and an immediate identification of the goods when an online purchase is made, even before the goods are being shipped.

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[16] The Globally Networked Customs Concept of the WCO aims to develop standardized ways to exchange information between customs administrations. These standards are described in full detail in so-called Utility Blocks. Developing a kind of Utility Block with a private stakeholder would be a first-of-a-kind project.

[17] The United Nations Centre for Trade Facilitation and Electronic Business. Its principal focus is on facilitating national and international transactions, through the simplification and harmonization of processes, procedures and information flows, hereby contributing to the growth of global commerce.

[18] The Combined Nomenclature is a further development of the Harmonized System with EU-specific subdivisions

Even though it is out-of-scope for this master thesis, it is worth mentioning that this also has important implications for the monitoring of safety, security and other non-fiscal measures (e.g. counterfeit, CITES, etc.). If an ASIN is used for the first time by a new vendor, this should be hit in the risk analysis, so customs can verify if this is a legitimate vendor or not. Similarly, the registration of a new ASIN points to a new product being sold, so that is also a shipment that could require more attention.

Information and physical flows
The figure below shows how a data pipeline for e-commerce could look like in a simplified manner. The blue arrows represent information flows, while the red arrows represent the physical flow of the goods.
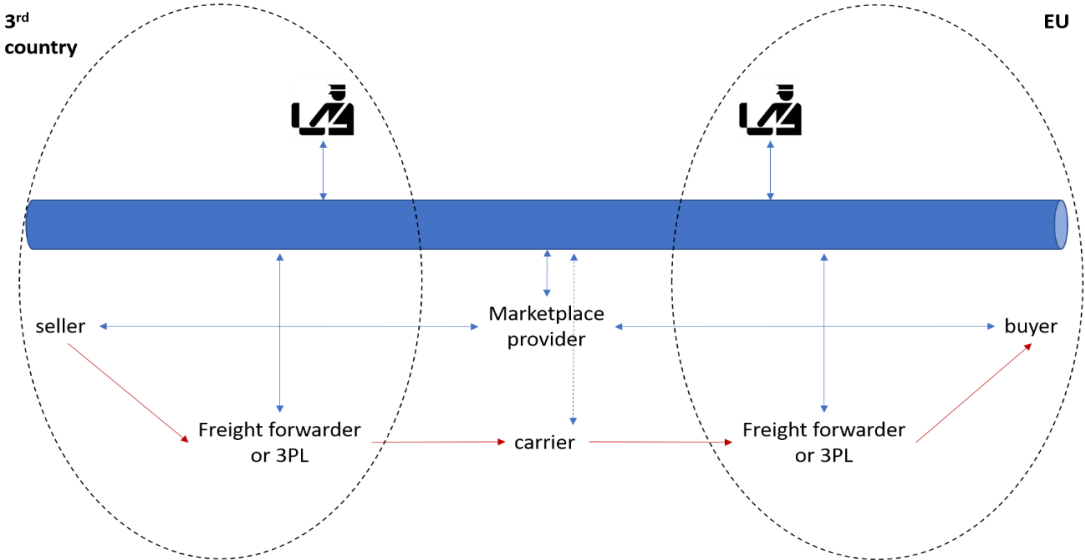

Figure 8. Data pipeline in an e-commerce environment

We see that the marketplace provider plays a central role in collecting all the commercial data, while data regarding the transport comes from the parties involved in the logistics. This is an important distinction to today's situation where this "commercial layer" is missing, because data is asked from intermediaries involved in the logistic process.

An additional factor that facilitates this set-up is the fact that the big marketplace providers often act as freight forwarder as well. Amazon even has started a carrier service, launching its own *Prime Air* planes in August 2016. This means that in that situation, Amazon has all the relevant data to lodge customs declarations. The benefit of this business model is that it reduces complexity and that there are no third parties involved who have an interest in reducing transparency along the supply chain (cf. supra: p.18).

However, we see that *stricto senso* the marketplace provider as such is not involved in the physical flow of the goods. That is why table 2 suggests that revenue collection does not necessarily need to be embedded in the logistic process. When a sale is made online, the marketplace provider can upload the commercial information in the pipeline. Of specific interest are the vendor/consignor, the buyer/consignee, the goods – which, thanks to the ASIN number, can be easily identified and transferred to a HS code –, and the value. In the EU the Union Customs Code (UCC) already allows the lodging of the customs declaration 30 days before the arrival of the goods (art. 171). In this way, this declaration could also be used as the Entry Summary Declaration (ENS), as foreseen in UCC art. 130, §1.

Then, the freight forwarder and/or the carrier would need to complete this declaration by adding the tracking number of the parcel (plus the number of the container when applicable), the mode of transport, waybill number, the estimated time of arrival, and exceptionally any incidents that could occur during the transport. It goes without saying that, just as in the original data pipeline concept, this data would not be visible to all parties connected to the supply chain. As marketplace providers are also offering 3PL and carrier services (cf. supra), it is obvious that other competitors in this area might not be open to share their data with them. This limited access can be set up via a system of virtual "keys" where everyone who uploads data in the pipeline can decide which other parties get a key to access that data. Customs would ideally receive a key of all participants in order to have access to full picture.

The advantage for the carrier in this system is that he only needs to lodge information which he possesses, whereas in the current system he is responsible to lodge all the required data elements, including information on the goods which he does not possess (cf. supra).

The above also entails that multiple filing of a declaration would need to be foreseen in the legislation. This already is the case in the EU for the ENS as art. 183, §1 of the UCC Implementing Act states that "[t]he particulars of the entry summary declaration may be provided by the submission of more than one dataset." However, this is not yet foreseen for the customs declaration itself, so a change of legislation would be necessary in order to bring this solution in practice.

At the moment of sale, customs could already check and validate the taxes owed through an automated risk analysis before shipment of the goods. A shipment could be selected for example if the price for that particular ASIN/HS code varies X percent of the regular range. Should that be the case, there is still time preshipment for officers to check the necessary information online or to make some inquiries. This is a huge distinction with today's situation, where data is often obscured and only available at the moment of arrival in the country of destination.

When this validation is done, an invitation to pay the due taxes should be sent to the buyer/consignee. For what concerns the actual revenue collection, I believe various models could coexist. Variations should be possible depending on the supply chain. Marketplace providers could offer this service and remit the revenue to customs, one of the intermediaries could do the same (as is the case today), or customs could offer this service directly. The latter option, in my opinion, is the most realistic and straightforward one. As people always have to submit an e-mail address to make an online purchase, this could be used by authorities to send an electronic invitation to pay.

This invitation does not constitute an additional IT message compared to the situation today where most often the amount is taken from a credit account of the declarant. However, in the case of e-commerce individuals will need to be directed to a page where they can transfer the money. This is a new page which would need to be developed by customs. Also enough server capacity needs to be foreseen to make the system run smoothly. Bart Cieters, IT expert of Belgian Customs, indicates that this investment is relatively limited taking into account the importance and the magnitude of e-commerce in our current society.

Once the payment is received, this shipment can be registered for the "green channel". When the freight forwarder or 3PL scans the reference number on arrival, he will be able to see that the goods are already cleared and immediately available for final delivery. As already indicated above, this is a significant commercial incentive in a market where there is a lot of competition to make the fastest delivery. Customs, on their turn, can benefit from the fact that they will hardly need to perform any

physical checks in these lanes. In this way, more resources become available to focus on unknown or untrusted trade lanes.

5.2.2. Data pipeline support in case of fulfilment

As explained in chapter 2, in case of fulfilment it seems almost impossible to apply one of the first five valuation methods prescribed by the WTO as declarants usually do not have access to information needed to apply valuation methods 2, 3, 4 or 5. However, a data pipeline could help to resolve this issue making use of the online identification numbers (like ASIN in our example above). If the pipeline is set up in a way that on the customs end sales data stays available for a predetermined period, this could be used to valuate shipments under the fulfilment business model. There are different options on which rule could be used, depending on the situation.

Situation 1: same product imported from the same exporting country in the recent past

If the same product has been imported from the same exporting country before, valuation rule 2 could be used, using the transaction value of identical goods. As an ASIN stands for a unique product, a data pipeline would allow customs administrations to look at the last registered price(s) for that product and apply that value. The conditions to apply this rule are that the goods are:

- the same in all respects including physical characteristics, quality, and reputation[19];
- produced in the same country as the goods being valued;
- produced by the producer of the goods being valued;
- sold for export to the same country of importation as the goods being valued;
- exported at or about the same time as the goods being valued. (WTO 1994)

There is, however, an exception foreseen when there are no identical goods produced by the same person in the country of production of the goods being valued. In that case, identical goods produced by a different person in the same country may be taken into account.

In my opinion, the fairest system would also take into account the identity of the vendor, as different vendors might use different prices for the product. The data pipeline could make this possible. However, this is not an obligation under the WTO valuation agreement. On the contrary, the agreement foresees that if more than one value is found, the lowest value shall be used.

The benefit of not taking into account the vendor is of course that no problem arises when a new vendor emerges for the same product.

Situation 2: a new, but similar product imported from the same exporting country in the recent past

Under this situation it is possible to apply valuation method number 3: transaction value of similar goods. This method offers a little bit more freedom as the previous one, although not that much. Goods still need to be imported from the same country in the recent past. The only major difference is that they do not need to be "the same in all respects". What is understood by "similar" can be explained as follows:

- closely resembling the goods being valued in terms of component materials and characteristics;
- capable of performing the same functions;

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[19] Minor differences in appearance would not preclude goods otherwise conforming to the definition from being regarded as identical.

- commercially interchangeable with the goods being valued. (WTO 1994)

Also in this method goods need to come from the same producer in principle, but with an exception that allows a value of similar goods from a different producer. From a practical point of view, this method will be much harder to apply and definitely more labour-intensive. As the ASIN is only the same for identical goods, similar goods are a bit harder to identify. However, if, as suggested in 4.2.1, the link is made with the HS (and/or GN) codes, multiple ASINs will be grouped under one HS/GN code. Yet, it will be impossible to automatically assume that another ASIN would qualify for the definition of similar goods. This will require further review from a customs officer. Nevertheless, the data pipeline can be an important tool to identify if valuation rule number 3 could be applied or not.

Situation 3: all other cases

In all other cases (e.g. same/similar product imported from a new country, same/similar product but no imports in the recent past, completely new product, etc.), we need to revert to the fallback method. The deductive method is not possible as there is no sales price yet, and the computed value – whereby all costs are added up – is unrealistic because of a lack of information. Even the vendor does not possess the necessary information to apply this method. Only the producer would be able to provide this, but he will be reluctant to do so, understandably. On top of that Article 6, §2 of the Valuation Agreement stipulates that:

> *No Member may require or compel any person not resident in its own territory to produce for examination, or to allow access to, any account or other record for the purposes of determining a computed value* (WTO 1994)

This makes it impossible to force any producer to provide information.

In my opinion, in the case an identical or similar product is imported from a "new" country, the most logical option would be to use the value of the identical or similar product from a different country. As the lowest value has to be used in case of multiple possibilities, this means that the trader potentially might have a one-time advantage. After the first sale, customs will be able to apply valuation rule number two for future shipments (cf. supra: situation 1).

When an identical or similar product is imported again for the first time after a long period without any importations, I believe the situation is not as clear-cut. However, we must admit that this situation is rather rare. Because of the speed of technological progress and improvements in the production process of many goods, a reappearing product would probably be a newer version and therefore not identical or similar. Nevertheless, in the hypothetical case that this situation would arise there are two alternatives which could be seen as reasonable. The first one would be to look at the old values of the identical or similar product in the past. This is, of course, suboptimal as prices may differ over time and also inflation might be a factor to consider. A second option would be to look at the value of identical or similar goods which have been imported in the recent past from a different country, just as was suggested in the previous paragraph. Also here we observe the limitation that prices may differ geographically. This means that no matter which option is used, there are some shortcomings. This will still need to be evaluated case by case.

There seems only one situation where the data pipeline would not be able to provide any support, yet it seems extremely rare. If a new product is imported for the first time as an e-commerce product and if this happens under the fulfilment model, there will be no data available in the data pipeline to support its valuation. If this product has already been imported under "regular commerce", customs

could apply that value. This would require more intervention from a customs officer as they would need to go data mining in the electronic declaration system of customs. As the ASIN is more specific than the HS/GN code (an ASIN is attributed to a specific product whereas a HS/GN can stand for a group of products), it would take more time to identify an identical or similar product.

6. Conclusion

Every day customs organizations experience that the traditional supervision approach that links information flows one-on-one to the logistics process is suboptimal. Crucial data elements that enable the monitoring of e-commerce are often missing and data quality is generally poor.

As a response to deal with this issue, organizations tend to turn to one of the parties in the supply chain. Also intermediaries are taken into account. However, the focus seems to lay solely on intermediaries involved in the logistics process. This situation has provoked the following research question: Which supervision model would allow customs to improve their control over e-commerce without disrupting commercial stakeholders' business models?

Above I have argued that the traditional approaches have their shortcomings and that there is a possible alternative when data capturing is decoupled from the logistical process. This can be achieved through the construction of a new artefact, a variant of data pipeline theory which until now has focused mainly on containerized B2B cargo flows. This master thesis in this way expands the applicability of current data pipeline theories to B2C traffic.

When debating e-commerce supervision models, one of the most important intermediaries often seems to be forgotten despite its crucial position in the commercial information flows, namely the marketplace provider. By reusing the data available on their platforms, customs can have access to accurate preshipment data allowing an advanced risk analysis and more targeted control. Because there are a few big players, already a relatively big portion of e-commerce can be covered by working with only a few parties. This would initially reduce the amount of interfaces that would need to be built. By setting up green channels, more attention and means can be directed towards unknown or untrusted e-commerce flows.

Moreover, I have explained how this artefact could also be a helpful tool in dealing with valuation problems caused by the fulfilment business model. Because the data pipeline provides greater accuracy in goods description than an HS/GN code can, identifying identical or similar products becomes a more realistic and workable solution than it is today. Even when customs would need to revert to the fallback method, a data pipeline could facilitate this valuation method, albeit not in an automated way.

Setting up a data pipeline for e-commerce would create benefits for all the stakeholders involved. Customs would have the chance to conduct preshipment analyses whereas today this is often a very manual and "last-minute" process. By creating known or trusted lanes, more resources can be directed towards those parcels where on arrival very limited data is available. The economic operators in the supply chain (seller, marketplaces, service providers, carriers, etc.) have the advantage that they only need to provide information they possess themselves, as data can be reused along the supply chain. They do not have to take responsibility for data that belongs to others as now is the case. At the same time, their supply chain becomes more predictable and trusted deliveries will be expedited. This will create positive reputation effects to increase their businesses. Last but not least, the consumer will also enjoy his expedited delivery knowing that the chance a problem on arrival at the border will occur is very limited. He will not suffer from additional administrative burdens like the need to proof the value through a paypall payment or an invoice as customs will have access to the correct value paid on the site. Also, he will know immediately what the parcel will cost him including duties and taxes, without any unpleasant surprises upon arrival. I believe this is an essential argument to set up these

lanes. Because now people might be reluctant to buy online, not knowing what extra costs might pop up on importation. It is also in the marketplace's interest to participate in a system where the consumers are assured they will see the complete cost immediately. This might incentivize them to buy more online, which would further boost their online business.

As I already explained in chapter two, the limited time for this research did not allow for a full implementation of the artefact. The evaluation phase consisted of validation of the artefact through conversations with experts in the relevant fields. As Hevner et al. (2004) already explained "the evaluation of the artefact provides feedback information and a better understanding of the problem in order to improve both the quality of the product and the design process" (Hevner et al. 2004, p. 78). Therefore, I hope this thesis can contribute to the creation of an awareness with all stakeholders involved of the potential of data pipelines, and that this awareness could lead to the setting up of a pilot to test this new artefact in order to improve it.

Moreover, even though this thesis includes suggestions for improving the e-commerce importation process, there are still some outstanding issues for further research. For example, in this thesis I did not elaborate on how to manage returns in a data pipeline environment. Even though it is a less frequent phenomenon, it would be interesting to study more deeply how this could be registered in the pipeline and how/if the duties paid to customs could be returned.

Furthermore, it would be interesting to elaborate on how to include non-fiscal measures (e.g. product safety, IPR, etc.) in this process. As we described briefly in this thesis, there is potential to identify trusted traders and, stemming from that, trusted trade lanes. Further research could include recommendations on how to deal with those trade lanes who make use of the data pipeline, and thus are ok from a fiscal perspective, but include unknown / little known traders. The goal of that research could be to come up with a control approach differentiating trusted trade lanes in the pipeline, little known traders in the pipeline, and shipments outside the pipeline. This would create a layered enforcement vision in analogy with what happens today in a lot of customs administrations for "regular" imports and exports. That research could be the final leap necessary to bring B2C e-commerce traffic to the same level as current B2B trade.

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