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# Automatization of Cross-Border Customs Declaration: Potential and Challenges

## A Case Study of the Estonian Customs Authority

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**Abstract.** This paper discusses challenges and obstacles of the Estonian customs authority while implementing the new EU VAT directive aiming to raise efficiency in the VAT declaration life-cycle. The general goal of the directive is to reduce cross-border fraud, gain revenue and modernize the system for governments and businesses. Due to the fact that the impact of the new VAT directive is tremendous, it also changes radically AS-IS work routines of customs authorities. The current paper presents the Estonian experience regarding the implementation of the new work procedures through providing data of the new technology developments and bringing out main concerns in terms of ongoing development activities. Transforming old ICT systems to newer platforms with regards to the new directive also changes current work procedures, which means that adjustments in the organization are also required. The central reason to move towards automatization is the dramatically increasing volumes of shipments requiring customs clearance. However, it is a complex process to achieve this task because of different or non-agreed data sets shared in the existing systems by various stakeholders as well as low quality of data. Consequently, the results of the paper are aimed to aid implementing the changes in various other customs authorities in the EU.

**Keywords:** Automatization, VAT, customs declaration, import one stop shop, IOSS

## 1 Introduction

In 2021, the new VAT directive and legislation will come into effect in the European Union (EU). Already now, the EU member states systematically prepare for adherence with the law. In these endeavours, the expected level of readiness of new customs declaration systems varies greatly between the EU member states. A major shift is caused by difficulties to handle the growing influx of new

customs controls and declarations. Today, consignments with intrinsic value under EU member state's specific VAT *de minimis threshold* (DMT)<sup>1</sup> get a free pass into free circulation. From the beginning of 2021, all goods purchased from outside the EU (third country online marketplaces) by a customer situated in the EU will be declared for VAT collection purposes. Based on 2018 statistics of the Estonian customs authority, the abolishment of VAT DMT will increase the total amount of customs declarations for postal consignments from 23k to 3M, which is roughly 130 times<sup>2</sup>. As maintaining the seamless flow of goods is crucial, EU customs authorities including Estonia are working hard to adapt national customs declaration systems – customs declaration systems are national, i.e., each member state has developed its own implementation [1]. With the increasing amount of declarations, even small delays in the declaring process would have negative consequences for EU citizens when ordering goods outside the EU.

The aim of this paper is to analyse a case of the Estonian customs authority where automatization of customs declarations is under development, focuses on caseworkers' interpretations of the upcoming challenges, and analyses how changes affect the new work procedures. In order to understand to what extent automatization is applicable in the customs declaration process, we first analyse the current situation and developments of our chosen case country. As Estonia is also member of the EU Commission's Customs Expert Group (CEG), we are focusing on current challenges faced by customs authorities both locally in Estonia and in the EU. In addition, Estonia is known as tech-savvy country where digital signing is widely used [2], digitalization has been reached into invoice workflows [3] and local governments have received a very high level of digital document exchange as a basis for the e-service transformation [4–7]. Therefore, we highlight related issues and open ends that should be resolved for the upcoming changes to take place. Furthermore, as interoperability is essential to make different information systems and organizations work together [8] and establish automatization, we elaborate the related data requirements set by the European Commission. Hence, we have formed the following research questions:

- RQ1 What procedures are currently performed for customs declarations in the Estonian customs authority?
- RQ2 How can automatization of customs declarations aid to cope with challenges of the new VAT directive?
- RQ3 What concerns are raised in relation to the upcoming changes?
- RQ4 What data quality is required to meet the new requirements with respect to automatization?

In Sect. 2, we provide a brief description of the background of changing legislation in the EU. In Sect. 3, we describe the research methodology. In Sect. 4, we provide the results. We proceed with a discussion of possible future directions in Sect. 5 and we finish the paper with a conclusion in Sect. 6.

<sup>1</sup> The VAT *de minimis threshold* in the EU member states is between 10 EUR to 22 EUR and varies across EU member states.

<sup>2</sup> Based on meetings with Estonian customs authorities.

## 2 Theoretical Background

### 2.1 Changing Legislation in the EU

E-commerce marketplaces enable thousands of different merchants to sell goods from non-EU countries to EU countries. A recent report conducted in 11 EU countries summarized that in 2019 more than 60% of European consumers who shopped online from a foreign country bought products from China [9]. A 2016 study reports that roughly 70% of e-commerce consignments flow through public postal channels, where VAT is unpaid on 65% of consignments, amounting to a loss of VAT income of around 1 billion EUR [10]. Additionally, by current VAT rules, consignments imported into the EU are completely exempted from VAT if they have an intrinsic value of less than the DMT, which opens up an opportunity for fraud, e.g., through undervaluing expensive items in importation paperwork [11].

New EU regulations will be in force from 1 July 2021 in order to combat these problems. Firstly, Council Directive (EU) 2017/2455 [12] will abolish the VAT DMT (Table 1). Specifically, the VAT rate due has to be in accordance to the EU member state in which the consignment receiving customer is located. Secondly, the EU will introduce liability to marketplaces regarding VAT collection on packages sent by merchants on their platform. Finally, the EU will set up a new Import One Stop Shop (IOSS) and *special arrangements schemes* for online marketplaces. These schemes will not only help to ensure the collection of VAT, but will also introduce much-needed simplifications that make fulfilling VAT obligations easier for businesses [13].

Value of consignment	Before 2021		After 2021	
	VAT	Customs duty	VAT	Customs duty
<b>Under DMT</b>	Exempt from VAT	Exempt from duty	VAT due	Exempt from duty
<b>Over DMT, under 150€</b>	VAT due	Exempt from duty	VAT due	Exempt from duty
<b>Over 150€</b>	VAT due	Customs duty due	VAT due	Customs duty due

**Table 1.** VAT and customs duties of consignments imported to the EU before and after 2021.

A new legislation in the EU Customs Code (UCC) brings forth significant changes in how low value customs declarations can be handled [14]. Specifically, a new article (Article 143a UCC-DA “Customs declaration for consignments of low value”) is radically changing EU customs and tax legislation for low value consignments. In general terms, this means that it will be possible to pre-lodge Super Reduced Data Sets (SRDS) of low value consignments prior to the UCC Article 5 (33) “presentation of the goods to customs” [15]. The SRDS technical details together with other declaration types are specified in the European Customs Data Model (EUCDM), which is part of UCC delegated regulations and the UCC implementing regulations. This separation of physical and fiscal flows of consignments helps to speed up the process of customs clearance and enables the potential of automatization.

## 2.2 Good Governance, Accountability and Transparency

Automatization of customs procedures plays an important role in the modernization of VAT collection. Through facilitating the VAT audits, collection of VAT and automatization of the customs processes, the opportunity to exercise fraud or inappropriate transactions can be minimized, particularly in the field of tax collection. Good governance remains one of the main reasons why a government or administration of a country works hard to provide services that are of quality and free of prejudice or corruption. According to Chan, “a mismanaged enterprise cannot flourish” [16]. Therefore, a government in its modern form, particularly in the developed countries, does not only depend on efficiency but also on the principles of accountability. The essence of the theory is to ensure that the citizens of the state are treated as the rightful citizens of the state and not just as the customers.

The research and analysis on good governance is usually limited to the issues related to development; taxation and VAT systems – as mentioned earlier – are an important part of development and require the application of practices related to good governance. The most essential factor utilized in order to ensure accountability in the area of public services, in particular, is transparency. Transparency is an important factor as it helps to hold accountable the personnel involved in the complete process. It remains as one of the main pillars on which the strategy to apply and implement an integrity system is built. According to Grindle “The principle of accountability in the real sense, emphasizes answerability for the use of state resources and assets earmarked for specific purposes, subject to the laws and their requirements” [17]. Accountability is a factor that is guaranteed through the element of transparency. It is one of the features that are important for decision making. The reason behind it is the fact that decisions that are made, need to conform to the set rules and regulations. A government that depends mostly on the tax revenues as compared to the natural resources or foreign aids is more likely to be held accountable by its citizens; as proper taxation serves as one of the main catalysts for the greater accountability of a government [18].

## 2.3 Related Work

The introduction and boom of e-commerce has allowed the EU countries to receive goods from the non-EU countries which has increased the number of stores and merchants sending products to EU consumers. Until now, as discussed earlier, VAT was not applied to a large proportion of these trades and purchases. However, with the growing number of e-commerce purchases, it has become essential to make sure that the necessary compliance strategies and procedures are in place [19]. Much research has been previously carried out in order to understand and recommend the necessary course of action to make e-commerce markets VAT compliant. In a research conducted by Papis, it is discussed that the VAT rules for e-commerce across different borders have gone through extensive modernization [20].

The emerging trend of e-commerce has also created several different issues related to the legality of the trade as well as the transactions being made online. The question here is to understand how VAT can be collected for these online purchases efficiently and effectively. There are certain compliance rules introduced and applied for the delivering of e-commerce products to customers in Europe. It is now a requirement for the business to establish where the customer is located in case the customer falls in the non-taxable category [21]. There are various different steps introduced that need to be followed to make sure that the businesses are VAT compliant. This includes determining the physical location of the customer in order to calculate the tax to be applied, keeping a record of all of the transactions as well as reports related to the VAT. This suggests that there is still a lot of work that needs to be done in order to make sure that VAT for the emerging e-commerce market and the policies related to it are up to date [22].

According to our previous research [23], the analysis of the European standards in today's system of VAT declaration is not enough by stating that the current system is "complex, burdensome, time-demanding, inconvenient, and not integrated". Thus, much needs to be done to achieve the required goals. An automated VAT system for this purpose can serve as a corner stone for a system that is agile as well as functional. Although, for the Estonian Government it can be beneficial but much more research is still required.

### 3 Research Methodology

The main author is currently involved in the Archimedes<sup>3</sup> research and development project 'e-Commerce EU VAT and Duty Declaration Digitalization 2021' as a leading analyst. The aim of the project is to develop an independent platform to exchange customs declaration data between various marketplaces and EU customs authorities. For the whole project and its research, the elements of action design research (ADR) [24] along with qualitative methods are applied to address the subject of automatization of customs declarations.

For this research, interviews are chosen as a source of primary data. The interviews are conducted with open ended questions with the purpose to get insight to actual concerns and open ends. In total, five focus group interviews were conducted with eight different people working at the Estonian Tax and Customs Board. Most interviewees were in the leading positions that are related to the changes influenced by VAT directive such as leading specialist, team lead, service manager, development analyst, development specialist from various departments etc. All discussion topics were sent prior to the meetings, so the Estonian customs authority representatives had enough time to prepare and gather relevant people to the focus group interviews. Table 2 provides an overview of the topics and the organizational origin of the participants.

Furthermore, a document analysis was used to serve as the secondary data which contains data gathered from various sources that focuses on the current

<sup>3</sup> <https://archimedes.ee/en/archimedes-foundation/>

Interview	Topics	Origin of case worker
1	The existing roles and procedures and data needed for declaring goods. Existing taxation principles.	Customs Law Team (Case worker 1), Customs Services Management Team (Case worker 2), Office for Direct and Indirect Taxation (Case worker 3), Customs application team (Case worker 4).
2	The future roles and procedures for declaring goods.	Customs Law Team (Case worker 1), Customs Services Management Team (Case worker 2)
3	Data requirements for low value consignments. Roles and responsibilities in IOSS scheme.	Customs Law Team (Case worker 1), Customs Services Management Team (Case worker 2), Accounting Office (Case worker 5).
4	New updates on data requirements by EUCDM. Quotas management. Banned and dangerous commodity groups in Estonia.	Customs Law Team (Case worker 1), Customs Services Management Team (Case worker 2), Customs Supervision Development Team (Case worker 6).
5	The latest developments of the new customs declaration system. Integration and automatization opportunities.	Customs Law Team (Case worker 1), Customs Services Management Team (Case worker 2), Customs application team (Case worker 7 and Case worker 8).

**Table 2.** Topics and the origin of participants in focus group interviews.

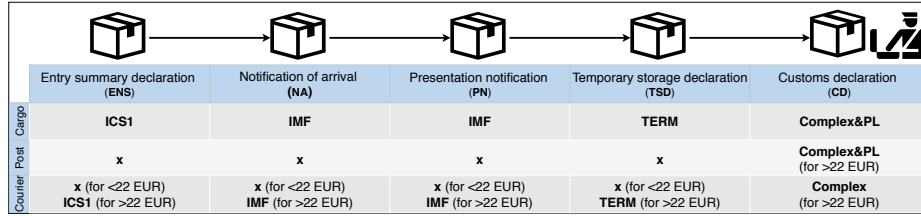
situation of e-commerce and EU customs authorities. This also involves various standards and legal acts regulating the field.

## 4 Results

*Answering RQ1: What procedures are currently performed for customs declarations in the Estonian customs authority?*

Based on the interviews with Estonian Tax and Customs Board, the main declaration process of goods goes through the following stages: Entry Summary Declaration (ENS), Arrival Notification (NA), Presentation Notification (PN), Temporary Storage Declaration (TSD) and finally, Customs Declaration (CD). In every step, a consignment might be taken under closer inspection (Green, Yellow, Red corridor) in case any irregularities or suspicions occur. The following scheme shows the customs procedural flow in the case where a consignment undergoes customs clearance at the point of import, e.g. the (rare) case where a China post or DHL airplane lands in Estonia and declares goods at Estonian customs.

Although the cases where third countries fly their cargo directly to Estonia almost never happen, the scheme above illustrates procedures that are followed by any EU member state customs authority until the 2021 changes are in effect. It is important to note that to date the national customs ICT systems (such as in the Estonian case: ICS1, IMF, TERM, Complex and PL) are EU member state specific national systems developed by each EU member state customs authority separately. Together with differences in the ICT systems, there are some varia-



**Fig. 1.** Customs declaration stages and ICT systems used in case goods are imported to Estonia (until 31 December 2020).

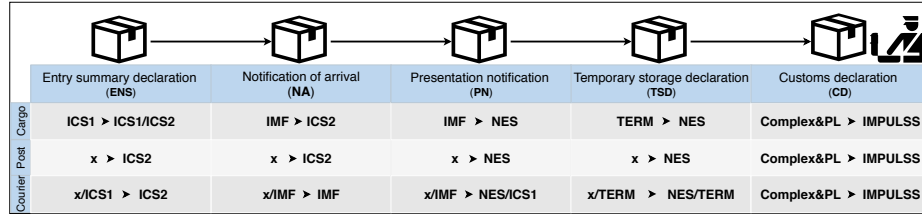
tions in country specific procedures. An example given by Case worker 1: “Temporary Storage Declaration process has been individual for each EU country, e.g. until 2016 in Germany warranty was not required but in Estonia, warranty was required. There were very diverse approaches. The new EU Customs Code regulates this procedure via establishment of harmonized EU wide data set as well as this process will be unified.” (Case worker 1) From the perspective of different logistics operators, many procedural variations exist, e.g. the ENS, NA, PN and TSD procedures have not been required for postal operators. However, for logistics companies (couriers) this exception is valid only for consignments with intrinsic value under the DMT. In 2021, the distinction between different types of operators and other procedural differences will incrementally be harmonized.

*Answering RQ2: How can automatization of customs declarations aid to cope with challenges of the new VAT directive?*

In order to cope with the changes starting from 2021, the main focus of Estonian Tax and Customs Board is to incrementally implement three new ICT systems: ICS2, NES and IMPULSS. The transition from ICS1 to ICS2 will not happen all at once, but will be the final goal. “ICS1 made separation between consignment view and shipment view, this was a real problem between different stakeholders in the process. ICS2 will use an option called multiple filing, which means that logistics operator can insert data from its part, then goods expediter can add data from its shipment, so the main benefit of ICS2 is that information shared by multiple stakeholders will be used for example to generate common ENS. Initially only 7+1 data elements will be used and later all data elements will be gradually expanded until middle of 2020’s.” (Case worker 1) The Estonian customs procedures are expected to change as shown in Figure 2.

Adding consignments to EU-wide common repository (ICS2) will ensure security and safety in the Union customs territory, bring consistency of customs clearance, and automatization of risk analysis of a consignment based on specific criteria [25]. The main reasons Estonia is implementing the new customs declaration ICT system (IMPULSS) to replace the existing ICT system (Complex) is because of the outdated technology, non-compliance with the new customs regulations and inability to handle the growing amount of declarations. To handle the growing amount of declarations for consignments of low value (under EUR





**Fig. 2.** Customs declaration stages and ICT systems used in case goods are imported to Estonia (after ICS2 implementation period).

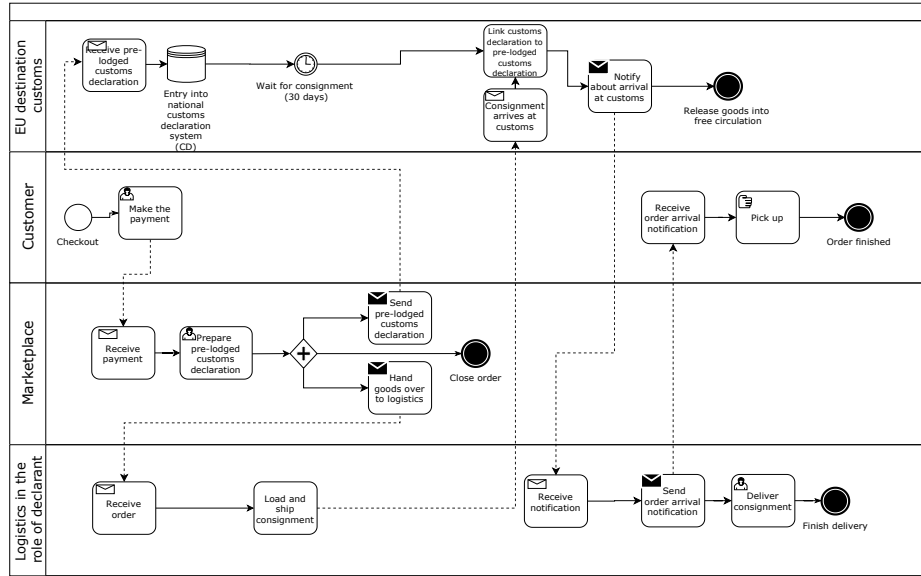
150), the separate types of data sets are formulated, called super-reduced data sets (SRDS).

“The main difference between SRDS and regular declaration is that there are some types of goods defined that are not allowed to declare and there are specific value limit to what level goods can be ordered. What Estonia today is using is also reduced data set, but it is our specific solution in regards to private customers in Estonia. We decided to ask only 10 data elements, when we could ask for 40. So it has been really simplified.” (Case worker 1) “The new regulation requires 22 data elements, so in reality the requirements declaring goods will not get simpler. However the data sets will be harmonized across the EU and there will be some flexibility for some data elements”. (Case worker 1) “IMPULSS will be the system where VAT related information will be managed. The IOSS scheme and special arrangements will be dealt in IMPULSS. The IOSS scheme is efficient because goods will be released from VAT at the moment of entry to the EU. As time is a critical factor, goods flow and fiscal flow will be separated so that flow of physical goods would not be delayed because of declaration procedures.” (Case worker 2).

Figure 3, which is based on our analysis, illustrates the expected future simplified process of physical consignment and data flow in case a low value consignment is purchased from a third country marketplace.

The process model explains the simplicity of declaring goods using the IOSS scheme (delivered duty paid - DDP). In reality, a logistics operator and declarant might not be in the same roles and a marketplace might not directly send the pre-lodged customs declaration to the EU customs authority (intermediate stakeholder could handle this type of task).

In 2021, if a marketplace facilitates a Delivered Duty Paid (DDP) sale from a third country to an EU member state, it will be responsible for paying VAT because it will be deemed to have purchased and then sold the goods. Hence, the marketplace is assigned to an IOSS scheme and has a VAT IOSS identification number registered in one of the EU member states. After checkout, the marketplace knows the assumed destination member state of the customer, either from IP address or from a destination address that the customer has specified. In our analysis, we assume the DDP model, i.e., the customer pays VAT to marketplace at the point of checkout. After checkout, the marketplace will send the pre-lodged customs declaration (with SRDS) to the destination customs au-



**Fig. 3.** Expected IOSS scheme process in case DDP (VAT is paid at checkout).

thority's ICT system. The SRDS can be sent to customs up to 30 days before the physical consignment arrives to customs. In that case, if the consignment is declared in another EU member state customs, the data set will be erased automatically.

In terms of the fiscal process, since the EU customs have periodical reporting procedures to tax authorities about in which country the goods were declared according to where the actual customer resided, the overview of expected VAT is still received through the collaboration of tax authorities. For example, if the customer lived in Estonia but goods were declared in Germany, then the VAT collected after checkout will be registered in the German customs and the reporting will go to the German tax authority who then periodically notifies the Estonian tax authority regarding how much tax is to be received from the marketplace's EU IOSS representative. Using such a separation of processes, automatization of declarations can be developed as well as transparency will be enabled, because tax authorities will be able to audit data sets and compare them with taxes received from third country marketplace IOSS representatives.

*Answering RQ3: What concerns are raised in relation to the upcoming changes?*

Multiple concerns were expressed throughout multiple interviews (see Table 3): IOSS VAT ID abuse, readiness, shifting the responsibility, localization and basis for developing the new CD system.

Based on the new VAT directive, the IOSS VAT ID number of a marketplace will be the unique number filled under one specific customs declaration

Topic	Case worker	Quotation
IOSS VAT ID abuse	Case worker 2	“Marketplaces will likely be trustworthy, they will likely not commit IOSS number fraud, but someone else could fraudulently use the IOSS number of a Marketplace.”
Readiness	Case worker 1	“The IMPULSS technical specification will come in the first half of next year (2020). Were promised in the beginning of next year, but...”
Shifting the responsibility	Case worker 1	“This pressure stems from the fact that currently those who present data are exactly the ones responsible. This is one of the reasons why there is a desire to shift this responsibility from parties like Omniva, who have not even seen inside the consignment, to those who have actually produced the data. But this change has not been made. For us, the responsible party is still Omniva.”
Localization	Case worker 3	“Customs declarations presented to us have to be in Estonian.”
Basis for developing the new CD system	Case worker 1	“Currently, the plan is to proceed with the knowledge that we will be implementing the newest version; up until we receive the very final decision on this. As long as we see any possibility, we will implement the newest version.”

**Table 3.** Topics and quotations from meetings.

data element in the SRDS. The customs authorities will not check correct ownership of the IOSS number, only the validity of it. There are strict rules for marketplaces; if someone fraudulently uses another’s IOSS number, then the IOSS number itself may be declared invalid. There are ongoing discussions on how to protect these numbers. Regarding the success of implementing the new CD ICT system IMPULSS, the Estonian tax authority heavily relies on what business decisions will be made by the different stakeholders; how will the postal operators contribute and how much will the couriers (e.g. DHL) contribute. During our research, the collaboration was thoroughly not initiated. Additionally, a concern was expressed regarding a mismatch between who is responsible for the content of a consignment versus who presents the customs declaration. Currently, the ones who are responsible (e.g. postal operators) have not seen the inside of a consignment. In the future, the responsible one should be the marketplace who presents the data for customs declaration. With the new changes ahead, a localisation issue seems to become a complication because so far, all declarations presented to the Estonian customs authorities are required to be in the local language (Estonian). However, the SRDS coming from third country marketplace is expected to be in English. Finally, it is still undecided whether the newest draft version or the current version of EUCDM will be required by

the EU Commission. It could still be that different EU member states will implement different versions. For now, it is clear that from 2023, all member states will have to implement the newest version. However, before that there will be a period of confusion as evidenced by the Estonian example and how difficulties can occur for the implementation of the new CD system.

*Answering RQ4: What data quality is required to meet the new requirements with respect to automatization?*

During our research on the EU Customs Data Model (EUCDM), we noticed a crucial change in the data set. While consulting with the Estonian customs authority, the feedback suggested that there is no clear understanding of which version of EUCDM will be required as the basis of data sets for low value consignments in 1 July 2021. The data requirements are in Annex B of UCC-DA[26], and their formats and codes are in Annex B of UCC-IA [27]. By analyzing the UCC Annex B, we found that for some data elements there is no clear understanding of the required format (e.g. length, clarity). For example, the goods description field, which describes the goods in a consignment, does not have a length or material description requirement despite the field being strictly related to a specific nomenclature code called a Harmonized System (HS) code. Based on our interviews with the Estonian customs authority, if such requirements were in place, validation of consignments could be automated to a large extent. The quality of data-based customs clearance depends on the quality of data sent in advance. Historically, this data has been non-existent for low value consignments and very poor overall. Poor data quality within the logistics chain leads to obscure or missing details in import declarations and makes the risk analysis and fiscal assessment of consignments more difficult for the customs authorities. In 2021, the volume of consignments requiring customs clearance will increase dramatically, thus the workload on customs authorities across the EU will increase. Anecdotally, based on our interviews, we know that European customs declarations will increase to approximately 4 billion per year. For example, for the Estonian customs authorities, the total volume of customs declarations for postal consignments would increase by roughly 130 times.

## 5 Limitations and Future Work

In the current research, we mainly concentrated on the changes in the customs authority and customs declaration process. The actual impact will be influencing the wider stakeholder ecosystem of e-commerce (marketplaces, declarants, IOSS intermediaries and postal and logistics operators) and many additional digitalization attempts to various data sets and procedures such as ENS, NA, PN and TSD. We suggest that there should be further analysis and research done in these specific fields.

## 6 Conclusion

This research shows that, by the example of the Estonian customs authority, automatization of customs declarations requires joint efforts by various stakeholders. The main concerns are not only related to technological developments but also to the clear guidelines that are being developed by the EU Commission, and also to the affected stakeholders such as postal operators and couriers. We also identified various difficulties and complications that the Estonian customs authority may face in the process of implementing the new requirements by 1 July 2021. Based on the interview results, the main improvements and concerns were presented as well as the description of the current procedures. The current procedures were analyzed through an overview of ICT systems that are currently being used in relation to customs declaration procedures. The new data quality requirements are presented in connection to the newly planned information systems. The results of this research serve as a good stepping stone to the goal of the Archimedes project which is to develop an independent platform to exchange customs declaration data between various marketplaces and the EU customs authorities. We have conducted this research to set an example and help the other EU member state customs authorities to rapidly develop and scale their systems.

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