The Importance of Applying Lean Innovation for Enhancing Harmonization of Customs Procedures in context of Digitalization of Customs Administration – A Case Study of Serbia

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Abstract As a part of the Strategy for modernization, customs administrations face a need for the introduction of new communication information technologies (ICTs) that builds on a long and successful European history on technology and innovation. Hence, apart from compliance of legislation that prescribes customs procedures, customs authorities face important decisions regarding design and implementation. In that context, this empirical research explores the extent to what digitalization of the Customs Administration of Serbia can improve the customs transit performances, in terms of enforcement of trading policy, without applying certain managerial tools, such as process thinking in lean innovation. The final data analysis of the research indicates that managing the organization through the functional units, rather than the processes, and without applying lean principles to the digital transformation initiative would not completely standardize the customs transit procedure.

Keywords: • customs administration • process thinking • lean innovation • new computerized transit system (NCTS) • Serbia

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1 Introduction

The modernization of the customs system, as a part of the new *Project of Technical Assistance to the Customs Administration of Serbia[1]*, is mainly focused on development on the new computerized transit System (NCTS) in the Republic of Serbia and on assistance on its accession to the Convention on a common transit[2] (further in the text Convention) (European Commission, 2011). In that respect, the introduction of the NCTS is supported by the Convention which Serbia joined on 1 February 2016 (EUR-Lex, 2010) by adopting the Law on Confirmation of *Common transit procedure* and Law on Confirmation of *Convention on simplification of formalities in trade in goods* by the Serbian Parliament (Official Gazette of RS – International contracts No. 13/2015). The NCTS is a European-wide electronic messaging system, based on a decentralized architecture in which national transit application must run in each customs administration of all member states of the European Union (EU) and European Free Trade Association (EFTA) countries (European Commission, 2007; EFTA, n.d.). Its use is mandatory for traders wishing to move goods under the community transit procedure, ensuring that transit declarations arrive in the appropriate customs offices before the goods themselves, automates the comparison between the declaration of departure and the declaration at arrival, and automatically triggers an alarm when goods do not arrive as planned (ADE, 2003).

Following the National project plan, Serbian customs started with the implementation of the NCTS on the national level as the first fully computerized paperless customs procedure. Full implementation of the NCTS procedure in the Republic of Serbia began in January 2015 within three levels as follows: (Official Gazette of the RS – International contracts No. 13/15) 1. Common domain (in charge of national customs administration and other customs administrations that are members of the Convention); 2. National domain (in charge of national customs administration); and, 3. External domain (the relation between a national customs administration and its economic operators).

The major donor in implementing the NCTS has been the EU, managed by Directorate General – Taxation and Customs Union (DG-TAXUD) situated in Brussel, which is responsible for EU policies on taxation and customs. One of the main missions of this Commission department, as an integral part in the achievement of the strategic aims of the EU, is to respond effectively to the international challenges associated with customs and tax policies: enlargement, international customs cooperation agreements and trade facilitation (European Commission, n.d.).

The digitalization of customs administrations (DG-TAXUD, 2013; EUR-Lex, 2020) aims at harmonization of customs performances to EU standards (EUR-Lex,

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2010), including the legislation and procedures (European Commission, 2007; Official Gazette of RS – International contracts No. 13/15; EUR-Lex, 2017), which would provide better services to the beneficiaries through removal of obstacles that limit the mobility of goods, services and factors of production between countries, as well as reduction or elimination of trade barriers and the coordination of monetary and fiscal policies (European Commission, 2008).

Customs systems comprise multiple processes, where the services to their beneficiaries are delivered through their execution. Therefore, the aim of the research is to explore the degree to which the introduction of the NCTS, which is responsible for the process execution, will standardize the customs transit performances without application of modern managerial approaches.

Referencing above, the purpose of the paper is to answer the research questions as follows:

First, the empirical research investigates the adoption of new ICT solutions in the customs procedures for transit (example of Serbian customs) by managing the functional units and departments, rather than the process. Therefore, the first research question is:
RQ1: To what level the digitalization of the customs system without process thinking in the innovation initiative, improves the customs procedures for transit, in terms of increased transparency and efficiency of customs control and coordination? Second, the empirical research also analyzes whether the digitalization of the customs system without applying certain managerial tools, such as lean methodology, enhances the customs services delivered to the beneficiaries as assumed. Therefore, the second research question is:
RQ2: To what level the customs services that are delivered to the beneficiaries are improved without applying lean methodology to the digitization of the customs transit system, in terms of reduced transit time and cost though reduction of redundant and lengthy procedures?

Following the research questions, the hypothesis of the paper is: the digitalization of the customs system without applying lean innovation would not enable Serbian customs administration to be flexible enough to respond to many societal, political and economic challenges through enhanced harmonization of the customs transit procedure.

Although there are some related works among the scholars, limited attention is given to the application of modern managerial tools to digitalization of customs administration, which could highlight the relevance of this study.

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The research questions and the hypothesis derive from the assumption that harmonization of customs transit procedure through implementation of the NCTS working terminals is supposed to improve efficiency, quality, as well as the response to the beneficiaries' request (European Commission, 2008). To some authors, the mentioned assumption requires enhancement of performance efficiency by implementing innovations in core processes and, hence, creates values to the users of their services (Nepal et al., 2011), since innovation is a key for an economy that works for people and making Europe fit for the digital age (European Commission, 2014). Furthermore, the application of lean methodology is associated in the relevant literature with improvement of services to beneficiaries through elimination of unnecessary activities, prolonged waiting time, unnecessary paperwork and ineffective communication (Yadav et al., 2017), which would enable customs administrations to introduce new policy solutions. Some scholars also argue that customs administration is required to build up ICT infrastructure based innovation capacity in order to harmonize customs transit system, which would result in improvement of beyond and out border operational efficiency through reducing trade cost, transit bottlenecks, redundant procedures, inefficient communication networks and other constraints that significantly affect trade volume (Nizeyiman & De Wulf, 2015).

The research was conducted at the most representative Serbian customs offices along Corridor 10 in order to evaluate the performances in both the old South East Cooperation Initiative (SECI) system and the NCTS regime. Collected data will be processed using the Program SPSS (Statistics Package for the Social Sciences) and Mc Excel software.

The remaining part of the paper is organized as follows: The second section provides literature overview. The third section describes the methodology of the research. The fourth section is reserved for results and discussion. The fifth section presents our conclusions.

2   Literature overview

2.1   Improvement of performances in public administration through digitalization

Evaluation of performances in public sector has been a focus in the related literature for a long time (Boyle, 2006). It is assumed that any change of public administration is directly associated with the conceptual ideas that come from different actors and beneficiaries. Considering the main actor in generating and execution of ideas is government, it has a significant influence on change in public administration (Brinkerhoff & Brinkerhoff, 2015). Besides, the structure of public administration

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system represents a reflection of social, political and economic aspects, where their change has significant impacts on its reform (de Oliveira, 2017).

However, public administration is generally criticized for its lack of flexibility and resistance to change. It is supposed that organizational changes should meet both external (of macro and micro environment), as well as internal challenges (innovations, crises, conflicts) and that it should aim at adjusting organizations to the development requirements of the society in general (Năstase et al., 2012).

The context of performance improvement of public administration also assumes transparency and participation in all fields. Thus, the change must encompass improvement in organizational structures and flexibility of managers, as well as permanent training of managers and staff. Moreover, the aim of improvement of public administration is enhancement of service quality delivered to its beneficiaries (Dragomir & Panzaru, 2012), as well as of direct relationship with actors.

In that respect, modernization of public organizations and administrations is mainly conducted through the application of innovative tools and policies aimed at: 1. achieving higher level of efficiency, through reorganization of working procedures and improvement of competencies of staff, leading to reduction of cost of services delivered to beneficiaries by public sector; 2. better transparency through total openness and better conditions for participation of actors and/or beneficiaries, allowing public sector to share all the information created and collected internally, as well as externally. In consequence, better transparency and accountability create an environment of better integrity by increasing trust in public institutions by their beneficiaries and actors (Transparency International Italia, 2014).

There are a number of studies in the relevant literature related to the waves of digitization of public administration (Dunleavy & Margetts, 2015). As an example, the work of Fishenden and Thompson (2013) focuses on the issues of digital governance and its open architecture, while some other studies focus on certain aspects of digital governance, i.e. Hallsworth (2016), arguing on the place and the role of digital technologies in modernizing healthcare system. Elsewhere, some authors emphasize the importance of digitalization of consumption processes of services provided by state organizations (Glick, 2015; Janssen et al., 2017). Nevertheless, there are some works that emphasize negative experience of introducing digital technologies in government organizations (Glick, 2015).

In addition, there are numerous studies related to open data and big data in the development of digital era in public institutions (Aggarwal, 2015; Höchtl et al., 2016). The organizational aspects of public administration are fundamental for its effectiveness in providing services to society. However, they are important but not determinant to guarantee good functioning of public administration and quality of

public services. Hence, interaction between public organizations and other actors and beneficiaries are the indicators of the way society functions, and the quality of services delivered (de Oliveira, 2017).

2.2 Digitalization of customs administration

As it is well-known, the revolution of information technology (IT) has an impact on reducing the cost of receiving, processing and transmitting of information, as well as on the overall way of doing business. In that context, IT is not just about computers, it also covers information that encompasses a wide range of processes and converged and connected technologies and other equipment and services by enhancing efficiency of services provided to users (de Oliveira, 2017).

As mentioned in the previous chapter, there are a number of works in the relevant literature related to introduction of digital technologies in administrative practice and digitalization problems in public administration, however, there are a limited number of studies devoted to the digitalization of customs system. As an example, the work of Gwardzińska (2012) points out that the implementation of the NCTS and e-Customs have many advantages for society, traders in particular, as well as for the governments in the EU member states countries. Moreover, in their works, Horvat (2011) and Erceg (2013) argue that computerization of customs transit system results in financial benefits for private and public users. Elsewhere, according to Widdowson (2007), as an integral part of public sector, customs administrations have been responsible for implementing a wide range of government policies, and as such, its role has changed significantly as a result of evolutionary factors, often on behalf of those factors. Moreover, Halloway (2007) argues that moving from paper based procedures through the basic automation to integrated e-Customs shows huge benefits in terms of improvement in efficiency and with respect to cost savings for business and government. Elsewhere, Granqvist, Hinsta and Mannisto define e-Customs as "an application of IT in public administration". To these actors, introduction of e-Customs is connected with the organizational changes and new abilities of public services, which aims at improving quality of services provided by government (Granqvist et al., 2012: 50). Whereas, to some authors, the single window, as the "single point of access", connects a national customs administration, which represent an organization that belongs to public administration, to the existing and future computerized customs systems of the EU member states (Vogel et al., 2008).

On the other side, customs experts have agreed that computerization yields its best results for customs administration when it is accompanied by complementary reforms of organization and procedures. However, they claim that international experience has demonstrated that customs administrations often find it difficult to implement this complementary component of the modernization efforts. It is not

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difficult to find an example where inappropriate introduction and use of computer systems have worsened existing problems. Therefore, in defining implementation strategy, different fundamental factors, i.e. the government's political issues, should be considered (Corfmat & Castro, 2003: 119-126).

In that respect, regarding the digitalization of customs in the EU, the Commission and the member states of the EU are committed to establishing pan-European service in order to ensure efficient, effective and interoperable information and communication system for public administration, so that the exchange of public information throughout Europe is carried out safely (DG-TAXUD, 2013; EUR-Lex, 2020).

It should be denoted that the aim of digitalization of customs administrations is to provide a structure and architecture in such a way as to: ensure effective control and facilitate the movement of goods through efficient export and import procedures (European Commission, 2008; EUR-Lex, 2020).

2.3   Lean innovation of business processes through digitalization

Innovation is a dynamic process that changes the overall architecture of organizations that belong to governments by identifying issues, through challenges, developing of new processes and by being creative in selecting and implementation of new solutions. Consequently, innovation process has a key role in increase of public organizations' efficiency and, hence, delivering higher quality public services to their beneficiaries (Matei & Bujac, 2016). Furthermore, there are debates that nowadays innovation in public sector represents an open access of collaboration between different actors across various organizations (Bekkers & Tummers, 2018), where governments strive to establish better collaboration with the stakeholders, such as companies, citizens and societal organizations (Sørensen & Torfing, 2011).

Accordingly, some scholars argue that process innovation, which is usually linked to various technological innovations, is very important in public sector (Brown & Osborne, 2012). Moreover, process innovation has a significant place in the 4th edition of Oslo Manual Basic Document, which represents the *Guidelines for the Collection, Reporting and Using data on Innovations*, according to which "Innovation is a new or process that differs significantly from the previous processes, and that has been made available to potential users or brought into use by the unit" (OECD, 2018). Business process innovation involves creating a system and method to improve the existing performance of an organization. The improvement objectives typically include: reducing cost, reducing process execution times, and reducing errors rates, but also gaining competitive advantage through innovation. Improving a process through innovation concerns the entire

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chain of events, activities and decision-making points that add value both to the
organization and to its customers (Dumas et al., 2018).

Considering the subject of the research, it is important to highlight that beneficiaries
consider themselves customers of public services, just like they are customers of
private businesses and therefore have the same expectations of public services.
Similarly, public sector employees have been encouraged to treat the recipients of
their services like private sector customers. As a consequence, customs
administration faces difficult decisions about whether it should aspire to meet the
service performance standards of a commercial organization. The only way to do
so is become substantially more cost effective (Elias & Davis, 2018). Therefore, in
implementing process innovation, great attention is given to creating value to
users/beneficiaries of public services, which to Radeka represents customer value
stream - emphasizing the users' needs and demands. Customer value stream is
realized by maximizing value and improving ability to create final results in the
easiest way possible with a low cost and reducing loss by eliminating activities that
do not create value (Radeka, 2013).

In that context, lean methodology, which represents an important and useful tool for
monitoring and managing process innovation that was implemented by Toyota, is
essential. As a modern managerial approach, lean is applied to eliminate the waste
in a process, i.e. prolonged waiting time due to ineffective communication,
complicated paperwork, etc. (Radeka, 2013; Yadav et al., 2017). Therefore, lean
innovation means creation of a system and working procedures for continuous
improvement as a part of working practice and routines (Sehensted & Sonnenberg,
2011: 44). Lean innovation is applied by public organizations as a mission of
establishing control process, as well as of evaluating and improving processes in
striving to achieve perfection and recognize weaknesses in a continuous
improvement (de Almeida et al., 2017).

Innovations are mainly related to adoption of new technologies, including IT
(Bashara & Mehta, 2016), where application of IT enables simplification of the flow
of activities and procedures, transparency and real-time monitoring. It also enables
employees on the operational level to make effective decisions by providing them
with real-time feedback when necessary (Craig & Yetton, 1992) and quick and
paperless transactions and processing through inter-organizational co-operation
(Čudanov et al., 2008).

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3   Methodology

3.1   NCTS evaluation variables

Based on data collected from Serbian customs administration that are compared to the customs provisions and regulations, which is explained in the next chapter, the transit process flow of both the new (NCTS) and the old (SECI) systems was created (Table 1 and 2).

Figure 1:   New paperless transit system – NCTS (shown through a process flow)
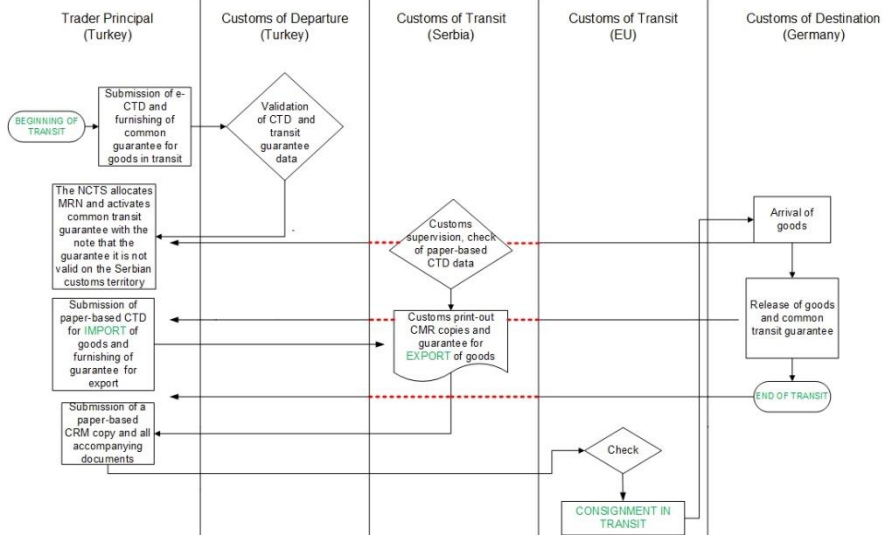

THE NCTS TRANSIT PROCESS
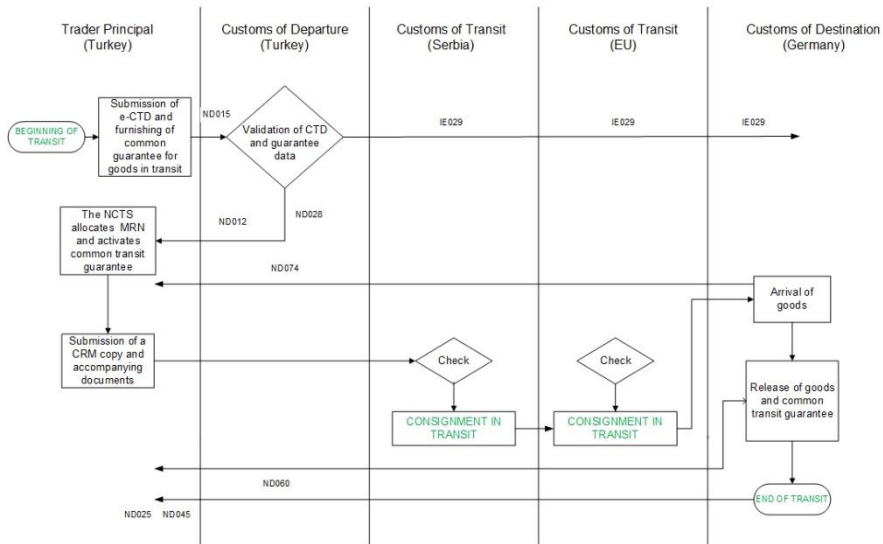
Source: Created by the authors based on the collected data

As presented in Figure 2, Serbian customs administration was excluded from the community transit in the old (SECI) transit system, meaning that, as an example, electronic customs transit declaration (e-CTD) and common transit guarantee were not valid on Serbian customs territory (Customs Administration of Serbia, 2015; EUR-Lex, 2017). Consequently, principals had to submit an additional CTD in paper format, as well as other transit accompanying documents (TAD) to Serbian customs authorities (if it was customs in transit), since it was not connected to the NCTS. The carrier also had to submit an application for temporary import, as well as to furnish an additional guarantee for export in paper format in order to transit through Serbian customs territory and continue moving the goods towards the country of destination (Figure 2). Meanwhile, the goods were under customs

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supervision and placed at the customs terminal (Official Gazette of RS – Customs Law No.18/10, 11/12 and No. 1/10), which prolonged transit time and caused additional cost. Considering that approaching Serbian customs territory represented interruption of the process of moving goods through the common transit, resulting in extended delays and cost to the trading and transporting companies, the carriers were seeking the alternative transit routes and avoiding Serbia as a transit point.

Figure 2: The old transit system – SECI (shown through a process flow)

Source: Created by the authors based on the collected data

The process flow of regular transit procedure, presented in Figure 1, is primarily based on electronic entering of CTD in to the centralized NCTS instead of submission of a CTD in paper format to each customs office throughout the transit regime. Furthermore, the new ICT solutions are supposed to establish harmonized procedures for furnishing of common transit guarantee and electronic submission of CTD and TAD in the common transit (Customs Administration of Serbia, 2015; European Commission, 2016; EUR-Lex, 2016), as the process input, whereas the release of common transit guarantee and goods at customs office of destination represents the process output. Therefore, the introduction of the NCTS aims at harmonization of the process, which consists of one input and one output, simplified activities and events, as well as well defined process boundaries.

Besides, Figure 1 shows that the activities and the events within the NCTS transit process flow are primarily based on message exchange (events), i.e.: 1. A principal lodges e-CTD via message ND015 (declaration data) at the declared customs office of departure; 2. The NCTS validates the lodged e-CTD and allocates a movement

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reference number (MRN) after successful checks by sending message ND012 (registration confirmation) to the principal; 3. After check of the presented goods and TAD, the NCTS sends message IE029 (release for transit) to the principal and all declared customs offices of transit; 4. During the course of moving goods through transit, the NCTS at each actual customs office of transit informs the customs office of departure that the certain MRN crossed the border; 5. Upon arrival of the goods and after the goods have been presented, the customs office of destination informs the customs office of departure by specifying MRN and sends message ND074 (arrival notification), message ND060 (notification about control decision) to the customs office of departure, as well as message ND045 (write-off notification) and ND025 (goods release notification) to the principal (European Commission, 2016).

Figures 1 and 2 clearly indicate that the NCTS aims at the process simplification throught its standardization, leading to significant reduction in time and transport expenses for moving of goods in transit.

3.2   Data and sampling procedure

The research was conducted through a case study of Serbian customs administration. During the research, a quantitative approach was used, which is known in the literature as concerned with the pre-defined variables and with the analysis associated with the relation between the variables (Aspers & Corte, 2019).

Apart from collection of data by interviews with the managers, as well as by analysis of the customs provisions and regulations in force (Figures 1 and 2), primary data were also collected through: 1. A structured survey with pre-designed questionnaires for the customs officers. Each questionnaire consisted of two sets of evaluation criteria per customs officer; the criteria after the introduction of the NCTS (regarded as NCTS group) and the same criteria before the introduction of the NCTS (regarded as SECI group) for the simultaneous testing of the groups (Table 1). In order to achieve the objectives of the research, 50 questionnaires were distributed to the most representative Serbian customs offices along Corridor 10. In response 36 questionnaires were returned. The response rate was 43 per cent. (Table 1); and 2. The method of interview with pre-designed questions with 35 economic operators (transporters and forwarders) that are the main beneficiaries along Corridor 10. Each operator answered two sets of evaluation criteria; the criteria after the introduction of the NCTS (regarded as NCTS group) and the same criteria before the introduction of the NCTS (regarded as SECI group) for the simultaneous testing of the groups (Table 1).

According to Corfmat and Castro (2003), to ensure that computer systems meet the objectives set by management, performance measurement needs to be established

for the system already in use, so that the new system can be evaluated against the old one.

Table 1: The sample structure

Variables	No.	%
NCTS group	71	100
SECI group	71	100
Type of users		
- Customs officers	36	50.7
- Beneficiaries (economic operators)	35	49.3
		N=71

The evaluation of the criteria by the customs officers and the economic operators was designed based on Likert 5 Rating Scale (1=Poor, 2= Fair, 3=Good, 4=Very Good and 5=Excellent). The respondents specified the grades of their attitudes regarding each of the following criteria: submission of CTD, inspection of goods and TAD for release for transit, furnishing of guarantee for transit, release of guarantee for transit, time spent on moving goods in transit, transparency in tracking of goods in transit, control of goods and documents for discharge of transit operation and coordination in both the NCTS and the SECI regime. To test the impact on the variables the collected data were analyzed through SPSS. The findings were compared with the extent literature.

3.3 Descriptive statistics for the digitalization of Serbian customs system

Descriptive statistics were used to measure the difference in evaluation of the criteria by the respondents, that were grouped in five clusters: procedures at customs office of departure, handling of guarantee certificates, procedures at customs offices of transit and procedures at customs office of destination (Tables 2 and 3).

The results in Table 2 show the evaluation of the customs officers concerning the given criteria from the moment the electronic (paperless) system was introduced (NCTS group) and before the electronic (paperless) system was introduced (SECI group).

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Table 2: The results of the descriptive analysis of the customs officers' perception

	Groups of criteria	NCTS group		SECI group	
		Mean	SD	Mean	SD
G1	Procedures at customs office of departure				
C1	Submission of CTD	3.60	0.419	4.00	0.154
C2	Inspection of goods and TAD for release for transit	3.71	1.017	4.14	0.648
G2	Handling of guarantee certificates				
C3	Furnishing of guarantee for transit	4.26	0.919	4.23	0.646
C4	Release of guarantee for transit	4.54	0.561	4.37	0.547
G3	Procedures at customs offices in transit				
C5	Time spent on moving goods in transit	3.89	0.993	3.37	0.646
C6	Transparency in tracking of goods in transit	3.43	0.917	3.94	0.765
G4	Procedures at customs office of destination				
C7	Control of goods and documents for discharge of transit operation	4.09	1.222	4.34	0.591
C8	Coordination with actors	4.11	0.676	3.74	0.611

Source: Created by the authors based on the collected data

Table 3 also shows the evaluation of the economic operators concerning the criteria from the moment the electronic (paperless) system was introduced (NCTS group) and before the electronic (paperless) system was introduced (SECI group).

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Table 3: The results of the descriptive analysis of the economic operators' perception

	Groups of criteria	NCTS group		SECI group	
		Mean	SD	Mean	SD
G1	Procedures at customs office of departure				
C1	Submission of CTD	3.36	0.867	3.28	0.659
C2	Inspection of goods and TAD for release for transit	3.67	0.717	3.75	0.649
G2	Handling of guarantee certificates				
C3	Furnishing of guarantee for transit	3.61	0.645	3.94	0.410
C4	Release of guarantee for transit	4.61	0.549	4.28	0.513
G3	Procedures at customs offices of transit				
C5	Time spent on moving goods in transit	2.94	1.094	3.03	0.654
C6	Transparency of tracking of goods in transit	4.00	0.676	3.33	0.478
G4	Procedures at customs office of destination				
C7	Control of goods and documents for discharge of transit operation	4.47	0.560	4.14	0.543
C8	Coordination with the customs authorities	3.53	0.845	3.72	0.701

Source: Created by the authors based on the collected data

The Independent T-test is used to confirm the (significant) difference in evaluation of the criteria between the NCTS and the SECI group of the customs officers and the NCTS and the SECI group of the economic operators (Table 4).

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Table 4: (Significant) difference in perception between the NCTS and the SECI group of the customs officers and the economic operators (T-test $p < 0.05$)

		Customs officers		Economic operators	
	Criteria	p value	df	p value	df
C1	Submission of CTD	0.051	66.012	0.648	65.345
C2	Inspection of goods and TAD for release for transit	0.039	57.722	0.607	69.317
C3	Furnishing of guarantee for transit	0.881	65.788	0.011	59.337
C4	Release of guarantee for transit	0.200	67.959	0.010	69.683
C5	Time spent on moving goods in transit	0.012	58.378	0.696	57.186
C6	Transparency in tracking of goods in transit	0.013	65.883	0.000	63.000
C7	Control of goods and documents for discharge of transit operation	0.266	49.099	0.012	69.931
C8	Coordination	0.019	67.310	0.299	67.716

Source: Created by the authors based on the collected data

The One Way ANOVA results show whether there are (significant) statistical differences with regard to the evaluation based on the type of users – customs officers or economic operators that are the main beneficiaries of the system.

Table 5: (Significant) difference in perception between the customs officers and the economic operators (One-way ANOVA $p < 0.05$)

	Criteria	p value	F
C1	Submission of CTD	0.001	5.689
C2	Inspection of goods and TAD for release for transit	0.041	2.833
C3	Furnishing of guarantee for transit	0.000	7.043
C4	Discharge of guarantee for transit	0.040	2.853
C5	Time spent on moving goods in transit	0.000	9.664
C6	Transparency in tracking of goods in transit	0.000	8.133
C7	Control of goods and documents for discharge of transit operation	0.134	1.893
C8	Coordination among all actors	0.007	4.158

Source: Created by the authors based on the collected data

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4 Discussion

4.1 Evaluation of procedures at customs office of departure

The descriptive analysis of data obtained by survey with the customs officers shows that the SECI group evaluated submission of CTD with the Mean 4.00 and the standard deviation 0.154, better than the NCTS group with the Mean 3.60 and the standard deviation 0.419. Moreover, the SECI group evaluated inspection of goods and TAD for release for transit with the Mean 4.14 and the standard deviation 0.648, that is also better than the NCTS group with the Mean 3.71 and the standard deviation 1.017 (Table 2).

On the other hand, based on the descriptive analysis of data obtained by the method of interview with the economic operators, the NCTS group evaluated submission of CTD with the Mean 3.36 and the standard deviation 0.867, better than the SECI group with the Mean 3.28 and the standard deviation 0.659. Elsewhere, the SECI group evaluated inspection of goods and TAD for release for transit with the Mean 3.75 and the standard deviation 0.649, better than the NCTS group with the Mean 3.67 and the standard deviation 0.717 (Table 3).

The Independent T-test (p value of the statements) shows that there is not a significant difference in evaluation of submission of CTD between the NCTS and the SECI group ($p=0.051$ and $df=66.012$), but, there is a significant difference in evaluation of inspection of goods and TAD for release for transit ($p=0.039$ and $df=57.722$) between the NCTS and the SECI group of the customs officers. Elsewhere, there is not a significant difference in evaluation of submission of CTD ($p=0.648$ and $df=65.345$) and inspection of goods and TAD for release for transit ($p=0.607$ and $df=69.317$) between the NCTS and the SECI group of the economic operators (Table 4).

The one-way ANOVA shows that there is a significant statistical difference in perception of submission of CTD ($p=0.001$ and $F=5.689$) and in perception of inspection of goods and TAD for release for transit ($p=0.041$ and $F=2.833$) between the customs officers and the economic operators (Table 5).

4.2 Evaluation of handling of guarantee certificates

The descriptive analysis of data obtained by survey with the customs officers shows that the NCTS group evaluated furnishing of guarantee for transit with the Mean 4.26 and the standard deviation 0.919, better than the SECI group with the Mean 4.23 and the standard deviation 0.646. The NCTS group also evaluated release of guarantee for transit with the Mean 4.54 and the standard deviation 0.561, better

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than the SECI group with the Mean of 4.37 and the standard deviation 0.547 (Table 2).

On the other hand, the descriptive analysis of data obtained by the method of interview with the economic operators, the SECI group evaluated furnishing of guarantee for transit with the Mean 3.94 and the standard deviation 0.410, better than the NCTS group with the Mean 3.61 and the standard deviation 0.645. Elsewhere, the NCTS group evaluated release of guarantee for transit with the Mean 4.61 and the standard deviation 0.549, better than the SECI group with the Mean 4.28 and the standard deviation 0.513 (Table 3).

The independent T-test (p value of the statements) shows that there is not a significant difference in evaluation of furnishing of guarantee for transit ($p=0.881$ and $df=65.788$) and of release of guarantee for goods in transit ($p=0.200$ and $df=67.959$) between the NCTS and the SECI group of the customs officers (Table 4). On the other hand, there is a significant difference in evaluation of furnishing of guarantee ($p=0.011$ and $df=59.337$), as well as release of guarantee for transit ($p=0.010$ and $df=69.683$) between the NCTS and the SECI group of the economic operators (Table 4).

The one-way ANOVA shows that there is a significant statistical difference in perception of furnishing of guarantee ($p=0.000$ and $F=7.043$) and in perception of release of guarantee for transit ($p=0.040$ and $F=2.853$) between the customs officers and the economic operators (Table 5).

4.3   Evaluation of procedures at customs offices in transit

The descriptive analysis of data obtained by survey with the customs officers shows that the NCTS group evaluated time spent on moving goods in transit with the Mean 3.89 and the standard deviation 0.993, better than the SECI group with the Mean 3.37 and the standard deviation 0.646. Elsewhere, the SECI group evaluated transparency in tracking of goods in transit with the Mean 3.94 and the standard deviation 0.765, better than the NCTS group with the Mean 3.43 and the standard deviation 0.917 (Table 2).

On the other hand, the descriptive analysis of data obtained by the method of interview with the economic operators shows that the SECI group evaluated time spent on moving goods in transit with the Mean 3.03 and the standard deviation 0.654, better than the NCTS group with the Mean 2.94 and the standard deviation 1.094. Elsewhere, the NCTS group evaluated transparency in tracking of goods in transit with the Mean 4.00 and the standard deviation 0.676, better than the SECI group with the Mean 3.33 and the standard deviation 0.478 (Table 3).

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The Independent T-test (p value of the statements) shows that there is a significant difference in perception of time spent on moving goods in transit (p=0.012 and df=58.378), as well as of transparency in tracking of goods in transit (p=0.013 and df=65.883), between the NCTS and the SECI group of the customs officers. Elsewhere, regarding the economic operators, there is not a significant difference in perception of time spent on moving goods in transit (p=0.696 and df=57.186), but there is a significant difference in perception of transparency in tracking of goods in transit (p=0.000 and df=63.000), between the NCTS and the SECI group (Table 4).

The one-way ANOVA shows that there is a significant statistical difference in perception of time spent on moving goods in transit (p=0.000 and F=9.664) and transparency in tracking of goods in transit (p=0.000 and F=8.133) between the customs officers and the economic operators (Table 5).

4.4   Evaluation of procedures at customs office of destination

The descriptive analysis of data obtained by survey with the customs officers shows that the SECI group evaluated control of goods and documents for discharge of transit operation with the Mean 4.34 and the standard deviation 0.591, better than the NCTS group with the Mean 4.09 and the standard deviation 1.222. Elsewhere, the NCTS group evaluated the coordination with another public and private actors with the Mean 4.11 and the standard deviation 0.676, better than the SECI group with the Mean 3.74 and the standard deviation 0.611 (Table 2).

On the other side, the descriptive analysis of data obtained by the method of interview with the economic operators shows that the NCTS group evaluated control of goods and documents for discharge of transit operation with the Mean 4.47 and the standard deviation 0.560, better than the SECI group with the Mean 4.14 and the standard deviation 0.543. Elsewhere, the SECI group evaluated coordination with the customs authorities with the Mean 3.72 and the standard deviation 0.701, better than the NCTS group with the Mean 3.53 and the standard deviation 0.845 (Table 3).

The independent T-test (p value of the statements) shows that there is not a significant difference in perception of control of goods and documents for discharge of transit operation (p=0.266 and df=49.099), but there is a significant difference in perception of coordination among the actors (p=0.019 and df=67.310) between these two groups of the customs officers (Table 4). Elsewhere, the results indicate that there is a significant difference in perception of control of goods and documents for discharge of transit operation (p=0.012 and df=69.931), but there is not a significant difference in perception of coordination with the customs authorities

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(p=0.299 and df=67.716) between these two groups of the economic operators (Table 4).

The one-way ANOVA indicates that there is not a significant statistical difference between the customs officers and the economic operators in perception of control of goods and documents for discharge of transit operation (p=0.134 and F=1.893), but there is a significant difference in perception of coordination (p=0.007 and F=4.158) between the customs officers and the economic operators (Table 5).

5   Conclusions

The final data analysis of the customs officers' perception indicates incomplete standardization of the operational processes, due to insufficient:1. Elimination of redundant activities in inspection of goods and TAD at departure (NCTS group Mean=3.71 and SECI group Mean=4.14); 2. Reduction of delays (caused by slowness with handling of submission of e-CTD), since the system often blocks due to high volume of documents (NCTS group Mean=3.60 and SECI group Mean=4.00); 3. Transparency (due to more complicated process of tracking of goods in transit through the system) (NCTS group Mean=3.43 and SECI group Mean=3.94). The customs officers' perception also indicates the problem with control for release of goods presented at arrival caused by incomplete standardization in exchanging notifications with customs offices at departure (NCTS group Mean=4.09 and SECI group Mean=4.34).

In addition, the results of the interview with the economic operators revealed that the introduction of the NCTS in Serbian customs administration did not result in the core benefit for the traders and transport associations as assumed, due to insufficient: 1. Reduction of delays and cost (caused by redundant procedures of inspection of goods and TAD for release for transit at departure) (NCTS group Mean=3.67 and SECI group Mean=3.75), as well as caused by incomplete harmonization of furnishing of guarantee with some members of the Convention in the region (NCTS group Mean=3.61 and SECI group Mean=3.94); 2. Improvement of coordination with the customs authorities (NCTS group Mean=3.53 and SECI group Mean=3.72); and 3. Reduction of transit time (NCTS group Mean=2.94 and SECI group Mean=3.03).

The research results, therefore, answer the research questions: 1.The introduction of the NCTS without process thinking in the innovation initiative did not completely improve the customs transit procedure due to ineffective clearance and insufficient transparency; and 2. The introduction of NCTS without applying lean methodology did not completely improve services to the users of the customs transit system as assumed, due to redundant and lengthy procedures, bottlenecks and inefficient communication network, resulting in protracted transit time.

As the result, the answers to the research questions confirm the hypothesis that the digitalization of the customs system in Serbia did not completely enhance the customs transit procedure without applying lean innovation.

Several studies of countries in the region, for example Croatia[3], point out certain advantages of the NCTS, i.e. savings in transit time and cost for the economic operators (Horvat, 2011; Erceg, 2013). However, a solid strategy for design and implementation in order to ensure successful computerization of customs administrations, designed by the EU, should be developed. Therefore, central to this study, application of certain modern managerial approaches along with contemplating different alternatives against the local context and the actual constraints in terms of resources and infrastructure is suggested, which could be considered the implication, as well as the novelty of this paper.

However, this study concentrated only on customs enforcement of trade policy and a limited number of data; it excluded analysis of benefits for the government in terms of revenue and protection of the society from prohibited goods, etc., which could be reserved for future research.

End notes:

[1] Standard Summary Project Fiche – IPA Centralised Programmes, Project Number 05, CRIS Number: 2011/022-385.
[2] Convention on a common transit from 20 May 1987 is used for the movement of goods between the EU member states, the EFTA countries, Turkey (since 1 December 2012), the FYR of Macedonia (since 1 July 2015) and Serbia (since 1 February 2016) (EUR-Lex, 2010).
[3] Croatian customs administration started implementing the NCTS on 1 July 2011 (Customs administration of Republic of Croatia, 2013).

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