LUMEN ET VIRTUS

Instrument to know at the Customs of Nuevo Laredo times of electronic customs clearance

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ABSTRACT

The administration of electronic customs clearance requires measuring instruments to know the times of each of the operations that comprise it, as an important factor to reduce the costs of the business sector, especially in the field of imports, whether under a definitive regime; to return abroad in the same state; for processing, transformation and repair in maquila or export programs. The objective of this article is to develop a measurement instrument that captures the feeling of the customs agents and agencies of the customs of Nuevo Laredo about the electronic customs clearance time. The sample consisted of 70 participants with a margin of error of 4.32%. The results showed a reliable measurement instrument with a total Cronbach's alpha of 0.983, and a significant association with a level 0.01 (bilateral) in the vast majority of constructs.

Keywords: Measuring instrument, Electronic customs clearance, Imports.

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INTRODUCTION

The import supply chain plays a relevant role in foreign trade operations that involves a series of actions ranging from the purchase contract, the supervision of the product's production, the manufacture of the good, logistics distribution, electronic customs clearance, and delivery to the buyer (Phadnis, 2024; Zhang, Turan, Sarker, & Essam, 2024). Import customs clearance involves the use of technology, which is why it is currently known as electronic clearance (Chamber of Deputies of the H. Congress of the Union, 2023) where the implementation of artificial intelligence facilitates the proactive monitoring and analysis of each formality to release the merchandise, in addition to having administrative control for both the customs authority and the taxpayer, through digital data that allows information related to the supply network to be managed (Badakhshan, & Ball, 2024; Brintrup, Kosasih, Schaffer, Zheng, Demirel, & MacCarthy, 2024).

Customs clearance in its electronic modality poses new opportunities for the automated detection of customs actors, including the customs agent and agency, associations, government agencies who operate through the Mexican digital window for foreign trade (VUCEM) (SAT, 2024; Sidorov, & Sidorova, 2020; Sidorov, & Sidorova, 2024). However, the use of technology in Mexican customs, the time to carry out a customs declaration in any of the customs regimes of definitive importation, temporary to return abroad in the same state; or for elaboration, transformation and repair in maquila or export programs, has been questioned by customs agents and agencies, who manifest a delay that directly affects the finances of entrepreneurs who need inputs or assets to carry out their business activity (Ivonne Zamora-Torres, & Gilberto Paz-Castro, 2020; Lagunas Puls, 2022).

The importance of having a measurement instrument that allows us to know the perception of the customs agent or agency on customs clearance times is a prevailing need for public policies, in such a way that it gives them truthful information to exercise a customs administration that positively impacts the reduction of costs of products that are sold in the domestic and international markets (Revista de Ciencias Sociales, 2013).

The Mexican government, as part of its international commitment to the World Trade Organization, carried out through the General Administration of Customs and the Central Administration of Customs Planning in 2019 [12] a study to know the times of customs clearance in importation, where public administration personnel participated, and associations related to customs matters, without directly considering customs agents and agencies.

For the above reasons, the objective of the research is to develop a measurement instrument that captures the feelings of the customs agents and agencies of the customs of Nuevo Laredo about the time of electronic customs clearance. To this end, the following hypotheses are proposed:

Hypothesis 1. The equality of means between the low and high groups of the sample shows a distinction between the different opinions on the times of electronic customs clearance.

Hypothesis 2. The measurement instrument to know the perception of the customs agents and agencies of the Nuevo Laredo customs on the electronic customs clearance time has an acceptable level of reliability.

Hypothesis 3. There is a significant correlation between the use of technology and the various processes of electronic customs clearance.

METHODOLOGY

Several stages were involved to test the measurement instrument through the recursive process of development, analysis and measurement verification, in which it was taken into consideration to previously submit the questionnaire to experts for analysis, the opinions were attended to and applied to the final measurement instrument. In addition to the following:

Design of the questionnaire: It was made up of 15 items carried out under the protection of the review of the customs clearance formalities provided for in the Customs Law, and applicable to the customs regimes of definitive importation; to return abroad in the same state; and for the preparation, transformation and repair in maquila and export programs (Chamber of Deputies of the Honorable Congress of the Union, 2023) carried out at the Nuevo Laredo customs office. Strict compliance with the code of ethics was given.

In each item except for the use of technology, the average time that the General Administration of Customs and the Central Administration of Customs Planning released in their study called "Study on Clearance Time in Mexico" in 2019 (General Administration of Customs and the Central Administration of Customs Planning, 2019].

The Likert scale used was the Likert scale, from 1 to 6, with the following criteria: "strongly disagree" with a value of 1, "disagree" with a value of 2, "somewhat disagree" with a value of 3 and "somewhat agree" with a value of 4, "agree" with a value of 5, and "strongly agree" with a value of 6. The constructs applied were the following:

1. He considers that the time it takes for a light vehicle with imported merchandise, which is not subject to verification by the customs authority, to cross the border line at Nuevo Laredo customs is approximately 7 minutes.
2. He considers that a light vehicle with imported merchandise, which is not subject to verification by the customs authority, at the beginning and end of the modulation of the pedimento at the Nuevo Laredo customs takes approximately 1 minute.
3. He considers that the time it takes for a light vehicle with imported merchandise already released, to leave the Nuevo Laredo customs office is approximately 5 minutes.
4. It considers that the time it takes for a light vehicle with imported goods, which was

subject to review by the customs authority through the automated selection mechanism (modulation), without resulting in a PAMA or PACO, to complete the modulation of the customs declaration takes approximately 69 minutes.

5. It considers that the time it takes for a light vehicle with imported merchandise, which was subject to review by the customs authority through the automated selection mechanism (modulated), without resulting in a PAMA or PACO, for the opening of the truck box at the Nuevo Laredo customs office is approximately 24 minutes.
6. It considers that the time it takes for a light vehicle with imported merchandise, which was subject to review by the customs authority through the automated selection mechanism (modulated), without resulting in a PAMA or PACO, for the purpose of unloading the merchandise from the truck bed, at the Nuevo Laredo customs office is approximately 18 minutes.
7. It considers that the time it takes for a light vehicle with imported merchandise, which was subject to review by the customs authority through the automated selection mechanism (modulated), without resulting in a PAMA or PACO, for the beginning and end of the customs recognition at the Nuevo Laredo customs office is approximately 42 minutes.
8. It considers that the time it takes for a light vehicle with imported merchandise, which was subject to review by the customs authority through the automated selection mechanism (modulated), without resulting in a PAMA or PACO, for the exit of the merchandise from customs at Nuevo Laredo customs is approximately 28 minutes.
9. It considers that the time it takes for a light vehicle with imported merchandise, which was subject to a non-intrusive X-ray review through the automated selection mechanism (modulated), without resulting in a PAMA or PACO, for the purpose of modulating the customs declaration in Nuevo Laredo is approximately 16 minutes.
10. It considers that the time it takes for a light vehicle with imported merchandise, which was subject to a non-intrusive X-ray review through the automated selection mechanism (modulated), without resulting in a PAMA or PACO, for the start of the scan and opinion at the Nuevo Laredo customs is approximately 9 minutes.
11. It considers that the time it takes for a light vehicle with imported merchandise, which was subject to a non-intrusive X-ray review through the automated selection mechanism (modulated), without resulting in a PAMA or PACO, for the exit of the merchandise from customs at the Nuevo Laredo customs is approximately 7 minutes.
12. It considers that the time it takes for a light vehicle with imported merchandise, which was subject to a non-intrusive gamma ray review through the automated selection

mechanism (modulated), without resulting in a PAMA or PACO, for the purpose of modulating the customs declaration in Nuevo Laredo is approximately 25 minutes.

13. It considers that the time it takes for a light vehicle with imported merchandise, which was subject to non-intrusive inspection by gamma rays through the automated selection mechanism (modulated), without resulting in a PAMA or PACO, for the initiation, scanning and opinion at the Nuevo Laredo customs is approximately 2 minutes.
14. It considers that the time it takes for a light vehicle with imported merchandise, which was subject to a non-intrusive gamma ray review through the automated selection mechanism (modulated), without resulting in a PAMA or PACO, for the exit of the merchandise from customs at Nuevo Laredo customs is approximately 3 minutes.
15. He considers that the use of technology strengthens by providing efficiency, effectiveness and time reduction to electronic customs clearance operations

Data collection: From a universe of 112 customs agents and agencies registered in the registry of the Chamber of Customs Agents of the Mexican Republic (CAAREM) (CAAREM, 2024). 70 participants participated and were contacted by telephone to explain the objective of the research, its importance, and that the information provided would be absolutely confidential and the perception would only be indicated through a statistical analysis. the measurement instrument was shared with them through Google forms. The margin of error was 4.32% with a confidence level of 95% and a probability of success of 90%.

Data processing: It was carried out using the IBM SPSS *Statistics* program, using the interquartile method, Student*'s T* test for the equality of means, for the analysis of internal consistency of the constructs Cronbac's Alpha was used, and to measure the relationship with the use of technology and electronic customs clearance procedures, Pearson's correlation was operated.

RESULTS AND DISCUSSION

According to hypothesis 1, the interquartile method, the twenty-fifth percentile was 2.4667 and the seventy-fifth percentile was 4.5333. In the *student t-test* for mean equality, the low group showed a difference compared to the high group, under the range of $\overline{X}$b = 1.00; SD=.000 in the crossover time variable that showed a range of a total mean of $\overline{X}$= 3.19; SD = 1.768, up to the item non-intrusive X-ray check exit of the goods with a mean of $\overline{X}$b = 3.94; SD = 1.478, and with a total mean of = 3.28; SD = 1.664.

Similarly, the results were as expected in the high group, ranging from a mean of $\overline{X}$ a= 5.00; SD=0.485 with a total mean of $\overline{X}$= 3.55; SD = 1.266 in the customs operation of exit from customs, together with the activity of exit of the goods from customs with an average of $\overline{X}$ a=5.00; SD=1.328 with a

total mean of $\overline{X}$= 3.28; SD = 1.664, up to $\overline{X}$ a = 6.00; SD= .000 with a total mean of $\overline{X}$= 4.22; SD = 1.617 in the aspect of the use of technology.

According to the information obtained, it should be noted that the measuring instrument does make a distinction between the various opinions on the times taken in each activity to carry out the legal stay of imported goods through the administrative formality of electronic customs clearance (see table 1)

Table 1. Student's *t-test* for mean equality between the low group (n=17) and the high group (n=18)

Items	t-test for equality of means						
	n= 70		Low group (n= 17)		High Group (n=18)		***t***
	$\overline{X}$	OF	$\overline{X}\,b$	OF	$\overline{X}\,to$	OF	
1.- Time to cross the border line at customs again Laredo	3.19	1.768	1.00	0.000	5.33	0.485	-37.901
2.- Start and end of modulation	3.45	1.567	1.12	0.332	5.11	0.323	-36.011
3.- Exit from customs	3.55	1.266	1.88	0.332	5.00	0.485	-22.292
4.-Revision by part of the customs authority to finalize	2.81	1.192	1.47	0.514	4.17	1.150	-9.032
5.- Opening the truck bed	2.67	1.314	1.29	0.470	4.39	1.037	-11.477
6.- End of the unloading of the goods from the truck bed	3.80	1.549	1.82	0.529	5.78	0.428	-24.244
7.- Start and end of the recognition customs	3.57	1.567	1.53	0.514	5.67	0.485	-24.446
8.- Departure of the goods from the customs	3.28	1.644	1.35	0.493	5.00	1.328	-10.882
9.- Non-intrusive lightning screening X end of the modulation of the pediment	3.09	1.541	1.35	0.493	5.17	0.857	-16.244
10.- Non-intrusive X-ray review, start of the scan and report	3.55	1.451	1.71	0.470	5.39	0.502	-22.433
11.-Non-intrusive X-ray inspection of the merchandise	3.28	1.644	3.94	1.478	4.50	1.543	-1.094
12.- Shoot gamma end of the modulation of the petition	4.07	1.478	1.88	0.781	5.61	0.502	-16.696
13.- Gamma rays start, scan and report	4.14	1.556	1.88	0.781	5.72	0.461	-17.581
14.-Gamma rays exit of the merchandise	4.23	1.330	2.47	0.717	5.78	0.428	-16.445
15.- Use of technology	4.22	1.617	2.00	0.791	6.00	0.000	-20.861

Source: The authors

In hypothesis 2, Cronbach's alpha showed a very significant level of reliability in all the *items* (α= 0.983). Similarly, in the case of the other items, if the element has been eliminated, the results were significant, ranging from α= 0.981 in most variables to α= *0.982 in three elements, at the exit from*

customs, at the inspection by the customs authority to finish, and at the opening of the truck bed. This implies that the measuring instrument has questions that are coherent with each other, and they accurately measure customs clearance times. In short, there is a reliability in the questionnaire, which yields questions that operate in harmony with robust results in the research, see Table 2.

Table 2. Cronbach's alpha if the element has been deleted (total α= 0.983) (n=70)

Items	*A* If the item has been deleted
Crossing time	0.981
Start and end of modulation	0.981
Customs Exit	0.982
Review by the customs authority to finalize	0.982
Opening the truck bed	0.982
End of unloading of goods from truck box	0.981
Start and end of customs recognition	0.981
Goods Exit from Customs	0.983
Non-intrusive X-ray review of the modulation of the petition	0.981
Non-intrusive X-ray review, start of scan and report	0.981
Non-intrusive X-ray inspection of goods	0.991
Gamma rays end of the modulation of the pediment	0.981
Gamma Ray Start, Scan and Opinion	0.981
Gamma rays output of the goods	0.981
Use of technology	0.981

Source: The authors

In hypothesis 3 the effects were relevant, a substantial correlation was noted between the use of technology with most of each of the customs clearance formalities that arise from a minimum r = .925, p < .01 in the *item* exit from customs, to r = .964, p < .01 of procedure gamma rays start, scanning and reporting. This implies that the greater the use of technology, the more efficient and effective customs clearance times are in the time of its execution. An exception was contemplated in the non-intrusive X-ray inspection operation of the goods, because it is currently carried out manually. However, if the technology were used, the probability of association could be relevant, see Table 3

Table 3. Pearson correlation between the variable use of technology and the other variables of customs clearance (n=70)

Items	r
Crossing time	,937**
Start and end of modulation	,947**
Customs Exit	,925**
Review by the customs authority to finalize	,831**
Opening the truck bed	,845**
End of unloading of goods from truck box	,946**
Start and end of customs recognition	,932**
Goods Exit from Customs	,879**

Non-intrusive X-ray review end of pedimento modulation	,895**
Non-intrusive X-ray review, start of scan and report	,939**
Non-intrusive X-ray inspection of goods	,075
Gamma rays end of the modulation of the pediment	,935**
Gamma Ray Start, Scan and Opinion	,964**
Gamma rays output of the goods	,941**
** The correlation is significant at the 0.01 level (bilateral).	
* The correlation is significant at the 0.05 level (bilateral).	

Source: The authors

WORK FOR THE FUTURE

Apply the measuring instrument in the 50 customs offices of the national territory, with some formal adjustments depending on whether it is a maritime, air or internal customs, to know the perspective on the customs clearance times under the definitive import regime, temporary to return abroad in the same state, or the temporary import for processing, transformation and repair in maquila or export programs, by customs agents and agencies, as well as the legal representative provided for in Article 40 of the Customs Law (Chamber of Deputies of the H. Congress of the Union, 2023). And even, take it to the business sector that carries out import operations, so that the results are taken into account

by the National Customs Agency and contribute to the implementation of an administrative plan that aims to make the times for the release of goods more efficient for the benefit of reducing costs for the import sector.

CONCLUSIONS

A measurement instrument was obtained following the methodological procedure to give it a very acceptable level of reliability. The design of the questionnaire was applied in a rigid way, which included multiple items related to the time of customs clearance. Data collection ensured an acceptable margin of error and responses from an adequate number of participants. With regard to data pre-processing, the questionnaire was delivered to experts in the field for review and the necessary adjustments were made. In the calculation of scores, the SPSS program was used to test internal consistency by applying the interquartile method, as well as *Student's* t-test, Cronbach's alpha and Pearson's correlation. With the above, the results tended to test the hypotheses.

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