



The effect of electronic customs administration on facilitating the export activities of export companies based in Gilan, Iran



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ABSTRACT

Sensitivity and importance of exports of goods and services to countries caused to identify the tool and its associated effective factors and strive to development of export. Customs services are important effective factors for the development of exports of goods and services. The current study examines the impact of electronic customs on export of goods and services. The results indicate that identifying new opportunities is effective to reduce transaction costs on export so that the reducing of transaction costs will be caused to creating a competitive advantage and will be developed with increasing in exports competitive advantage of goods and services. Also, the results showed that the reduction of transaction costs impacts on the export development.

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1. Introduction

One of the most vital sectors of any economy constitutes export. Exports of goods and services are the main source of foreign exchange in any country, generating the pulse of any economy in the world. Since the Iranian oil reserves are limited, and will be depleted by 2096 according to the Ministry of Petroleum, there is no other choice but to interact with global markets so as to attain economic development and employment through non-oil exports. In this regard, it is essential to understand the contributing factors so that policy-makers can in times of need improve and strengthen their efforts (Karampour, Sharifi, & Safabakhsh, 2012).

E-commerce is the outcome of advancement in information technology embraced widely in today's business world. Concerning the development and deployment of this technology in developing countries including Iran, however, there is a huge gap with advanced countries (Akbari, Moslehi, Fathi, & Bozorgmehr, 2007). A portion of international trade is covered by exporting. In fact, one strategy to enhance the foreign currency earnings and thus economic development is to exports goods and services (Hashemi, 2010). The significance of exporting goods and services has prompted the countries to identify the contributing factors and make great efforts to develop the export activities. Customs services are among the factors contributing to the development of exporting goods and services (Shams al-Din, 2012).

In fact, customs administration is one of the fundamental elements of international trade cycle, without which it is impossible to complete the processes of export, import and transit procedures and formalities. Moreover, the completion

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of the business cycle requires the exchange of large volumes of commercial documents and information, where it is often observed that various organizations involved in the completion of business processes attempt to obtain identical information in different forms. This increases the time and cost of completing business processes, between 4 and 7 percent of shipment value. Due to the high volume of commercial cargo exchanged each year between different countries, which percentage is quite remarkable figure, revealing the need to move towards trade facilitation (Bordonaba-Juste, Lucia-Palacios, & Polo-Redondo, 2012).

One of the techniques to facilitate trade is to equip the organizations involved in business processes to with modern technologies. The ICT applications play a key role for electronic data interchange in the form of electronic customs systems. In this regard, many countries have begun to implement an electronic customs administration, experiencing the benefits and positive effects of the operation (Karimi, 2011). In Iran, several measures have been taken to equip the Customs Organization to modern information and communications technologies. However, the survey results indicate the poor competitiveness of Iranian cross-border business. Strengthening the competitiveness of the country in cross-border trade can set the ground for developing the exports through increasing competitiveness and substantially saving the costs and time. One of the strategies to strengthen the competitiveness of the country is to improve the trade facilitation through the deployment of modern systems equipped with information and communication technology such as electronic customs system.

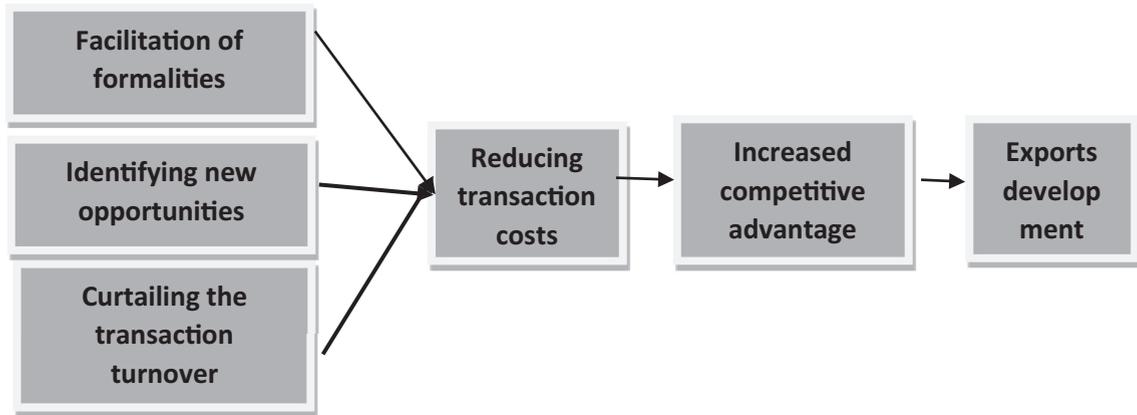
With regard to the issues raised above, this study attempted to explore the impact of electronic customs administration on the export development.

2. Literature review

Ramezanpoor et al. conducted an investigation in 2014, mainly to raise awareness about the concept of e-commerce and recognizing the developmental stages and factors in their application as well as its impact on export development and the key factors in the successful implementation of e-commerce. Hussein, Ali, Abadi, and al-Faqih (2013) suggested that the weakness in export of technical and engineering services for oil and gas not only deprived Iran from the only chance to National Development, but also posed a threat in the long run. Nowadays, so long as a nation relies only on energy exports without utilizing the knowledge in development of the technical and engineering services abroad, estimates suggest that Iran will become an importer rather than a net exporter of energy in the not too distant future. In an article titled "Practical implementation of electronic customs to increase administrative and health efficiency and safety using RFID technology", Alipour Shirsavar, Mahdi, Varkaroud, Khandani, and Hosseini (2013) explored the benefits of using technology, remote identification of goods and objects using radio waves in the electronic customs administration. They provided practical solutions such as the use of RF securities, smart blocking and RF tags in load containers, declaration cases etc., so as to adopt the technology in customs operations and activities of individuals, offices and related companies involved in import-export and transit of goods etc. This leads to an increased efficiency of customs duty and the security of exchanges and transactions by implementation of an electronic customs as part of the body of the e-government. On the other hand, the imposition of subtle controls can be an effective step taken towards the health promotion of offices within the country's economic system. In an article titled "Advantage of e-commerce in the customs enforcement, Aqajani, Gul, Anne, and Rahmanqoli (2010) concluded that electronic customs and its features constitute one of the main sectors of e-government or e-commerce where the Customs Organization naturally plays one of the main roles. In their article, Bordonaba-Juste et al. (2012) pursued two objectives: Firstly, analyzing the size and other organizational factors (IT knowledge, external IT support and education of employees) on the use of e-business. Secondly, identifying the similarities and differences among these factors on the micro, small, medium, and large levels. Durmuşoğlu, Apfelthaler, Nayir, Alvarez, and Mughan (2012) explored the impact of export promotion services and tools designed by the government on 143 SMEs in Turkey as a developing country. The new model approached the export performance through a four-dimensional perspective, depicting how the government export promotion programs affect the four dimensions of export performance. The four dimensions are: 1. Financial performance 2. Objectives related to stakeholders 3. Strategic objectives 4. Objectives related to organizational learning.

3. Conceptual model

The theoretical framework of this study was derived from Ramazanipour, Beroshd, and Ramazanipour (2014), Elahi and Hasanzadeh (2007). By combining the results of the literature review, research background, and evaluation of conceptual models in export development and electronic customs based on the interviews with managers of exports companies about extraction of factors, criteria and indicators influential in electronic customs, all the structures and interrelationships were identified and the scientific infrastructure was confirmed. In order to increase the accuracy of the model, expert opinions from prestigious universities were also employed. After combining the results obtained and the process of modeling and putting together the relationship between independent and coordinated several studies, the scientific and conceptual model was developed based on studies depicted in the figure below; In this model, the dependent variable was exports development, while the independent variables were facilitation of formalities, identifying new opportunities, curtailing the transaction turnover, and enhancing the competitive advantage was a mediator variable:



Ramezanpoor et al. (2014), Elahi et al. (2007)

Table 1.
Reliability coefficients for the data collection tool.

Dimensions	Related items	Cronbach's alpha
Facilitation of formalities	1–5	0.78
Identifying new opportunities	6–10	0.88
Curtailling the transaction turnover	11–15	0.83
Reducing transaction costs	16–20	0.87
Competitive advantage	21–26	0.83
Exports development	27–32	0.88

Source: Researching Findings.

According to the analytical model proposed, there are several hypotheses including:

1. Facilitating the formalities is effective in reducing transaction costs.
2. Identifying new opportunities is effective in reducing transaction costs.
3. Curtailling transaction turnover is effective in reducing transaction costs.
4. Reducing transaction costs is effective in increasing competitive advantage.
5. Increased competitive advantage is effective in export promotion.
6. Reducing transaction costs is effective in exports development.

4. Methodology

This study was applied in terms of objective. This was a survey in methodological terms, where effort was made to examine the effect of variables on each other through the process of decision-making about the hypothesis, the research population and sample selection, data collection, and analysis of data.

In terms of time, this was a cross-sectional research where the observations are made within a short period for data collection. In terms of data collection, this was a field survey where the population consisted of export companies based in Gilan, Iran. Given that there are 108 export companies in Gilan, the preliminary samples were selected and sample variance was obtained to be 0.49.

The following Cochran formula was used for sampling:

$$n = \frac{Nz_{\alpha/2}^2 s_x^2}{d^2(N-1) + z_{\alpha/2}^2 s_x^2} = \frac{108 \times (1.96)^2 (0.49)^2}{(0.05)^2 \times (108 - 1) + (1.96)^2 \times (0.49)^2} = 84 \quad (1)$$

$108N=0.05/0.05$ $d=0.05$ $z_{\alpha/2}=1.96$ $s_x=0.49$.

The study population was selected with regard to the objective to be all senior managers in export companies in Gilan. In this study, researchers selected a method due to the recognition of a convenient sample population non-probable and available. Moreover, the reliability of the questionnaire was determined through distributing 30 sheets of the questionnaire so as to evaluate the Cronbach's alpha, which was finally calculated for each variable confirming the adequately high reliability of the questionnaire. The results of reliability testing for each variable are shown in the table below [Tables 1–4](#)

Table 2

Confirmatory factor analysis of the questionnaire structure.

Fitness indicator	RMSEA	NFI	NNFI	IFI	CFI
Acceptable values	≤0.08	>0.9	>0.9	0–1	>0.9
Calculated values	0.12	0.90	0.90	0.91	0.97

Table 3

The significant numbers and standard estimation of the structural equation model.

Fitness indicator	RMSEA	NFI	NNFI	IFI	CFI
Acceptable values	≤0.08	>0.9	>0.9	0–1	>0.9
Calculated values	0.13	0.93	0.95	0.95	0.96

Table 4

The results from the measurement model at significance level of 0.05.

Hypotheses in the conceptual model	T-Value	Standard coefficient	Results
1. Facilitating the formalities is effective in reducing transaction costs.	–1.59	–0.14	Rejected
2. Identifying new opportunities is effective in reducing transaction costs.	4.05	0.45	Proven
3. Curtailing transaction turnover is effective in reducing transaction costs.	3.99	0.49	Proven
4. Reducing transaction costs is effective in increasing competitive advantage.	5.28	0.89	Proven
5. Increased competitive advantage is effective in export promotion.	3.93	0.67	Proven
6. Reducing transaction costs is effective in exports development.		0.89*0.67	Proven

5. Findings

The structural equation modeling and LISREL were used to test the research hypotheses. To achieve this, the data were evaluated in terms of normal distribution. Then, the confirmatory factor analysis was done for each questionnaire. Finally, the model corresponding to the hypotheses was implemented.

In this study, a questionnaire was used to collect the data. Therefore, the confirmatory factor analysis was employed to assess the overall structure and content of the research questionnaire. The standard factor load and t-statistic were calculated for the confirmatory factor analysis and structural equation modeling. In this section, the measurement models for the structural equation modeling is evaluated in terms of accuracy of the measurement structures and the relevant index. This section determines how the application of confirmatory factor analysis assesses the questions designed for each structure. In other words, are the questions and indicators sufficiently valid?

After the review, it was observed that all the indicators considered for all questions related to model variables were above 0.3. Moreover, due to the fact that all the values obtained in the significant model were greater than 1.96, the validity of the measurement constructs for the relevant variables was confirmed at significance level of 0.05.

6. Model fitness

In this model, the chi-square value was degree of freedom at 2.64. Furthermore, the estimated value of the Root Mean Square Error of Approximation (RMSEA) was equal to 0.12 and more than 0.08. Adaptive fitness index (CFI), increase fitness index (IFI), norm of the fitness index (NFI) and non-normalized fitness index (NNFI) were all greater than 0.9, then the model was approved at an excellent fitness.

The table above shows that the CFA of the questionnaire constructs enjoy a desirable fitting representing the corresponding variables.

7. Testing the conceptual model

The model involved three independent variables (facilitation of formalities, identifying new opportunities, curtailing the transaction turnover) and two intermediate variables (reducing transaction costs and increasing competitive advantage) and one dependent variable (exports development). Before confirming the structural equations, the model should be assessed in terms of suitability and fitness. In this model, the chi-square value was degree of freedom at 2.35 which is desirable. Adaptive fitness index (CFI), increase fitness index (IFI), norm of the fitness index (NFI) and non-normalized fitness index (NNFI) were all greater than 0.9, then the model was approved at a good fitness.

The following figures illustrate the significant numbers and standardized estimation of structural equation model for the conceptual model based on the relationship between independent variables and the dependent variables [Figs. 1 and 2](#).

From the measurement model of standardized coefficient, it can be deduced that there is a significantly positive correlation between the latent variables and their corresponding indexes. The standardized coefficients suggest the path coefficients

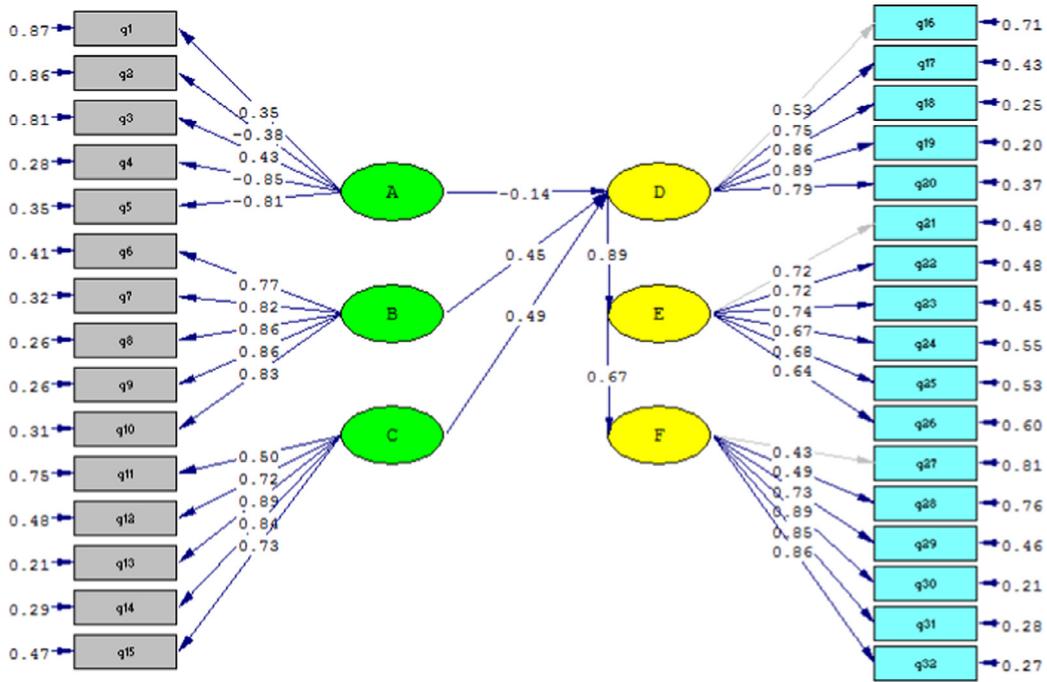


Fig. 1. Significant numbers and standardized estimation of structural equation model.

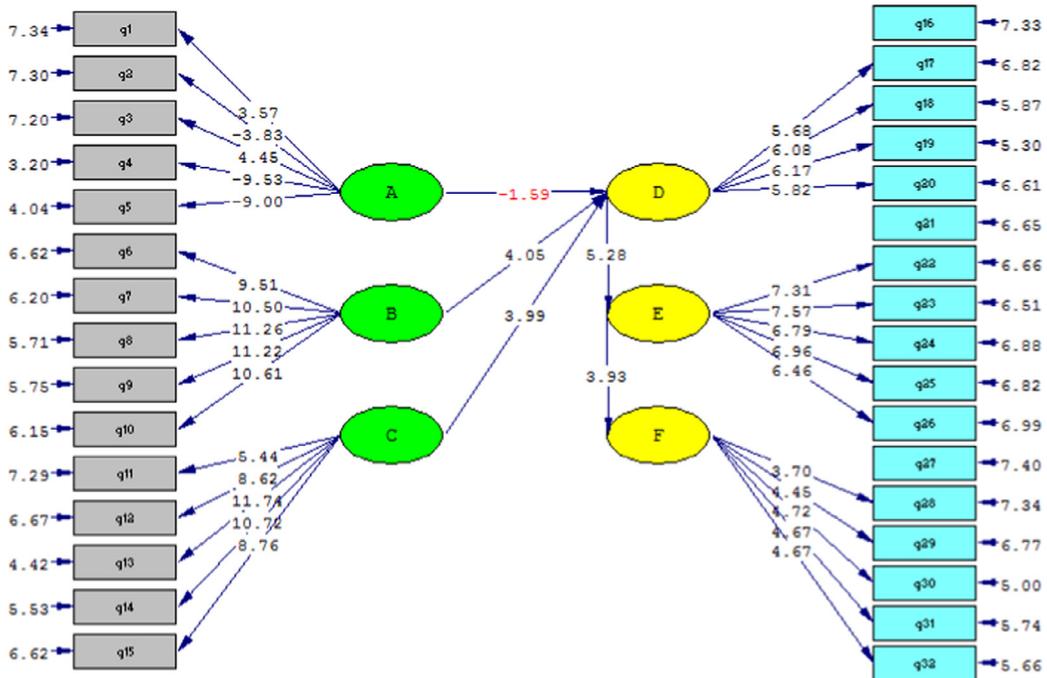


Fig. 2. Significant numbers and standardized estimation of structural equation model.

or standardized factor loadings between factors and indicators. In order to obtain validity, there should be a significant positive correlation between structure and dimension, and between dimension and indicator. The standard estimation model is derived from the two covariance matrices of data model representing the actual parameters of the model. In this model, the relationship between the structure and dimension, dimension and indicator is illustrated. If the relationship is higher than 0.3, then it can be stated that the items are sufficiently explanatory.

As mentioned earlier, the standard estimation is provided so as to use the binary correlation coefficients for comparison between indicators and indicators, even though it does not apply to the significance of these factors which cannot be used on a large or small coefficients, but instead a t-index is used to determine the significance of the path coefficients. The significant numbers model is provided so as to clarify whether or not there is a significant relationship between the structure and dimension and between dimension and indicator. The significant numbers model or T-Value represents the significance of each parameter, which is significant if the value is greater than absolute value of 1.96. Since there are certain significant numbers in the model parameters are greater than the absolute value of 1.96, the hypothesis corresponding to the variable is proved, while the other hypotheses where the significance number of lower than 1.96 are rejected.

8. Summary and conclusions

Although three decades have passed since the advent of e-commerce and business, this solution has broadly developed and embraced. Hence, small, medium and large organizations that have a major role in economic development should train the employees at different levels with the concept of e-commerce and the key factors in its successful implementation as well as its impact on export development. In this light, the employees will play a key role in promoting e-business (facilitating and accelerating) and understanding the business processes, thereby to significantly reduce costs, increase efficiency and improve the quality of operations and focus mainly on the production process and minimize risks. Furthermore, the developing countries should devise a systematic plan to more than ever adopt this solution.

As a gateway to foreign trade, the customs administration is important in enforcement of economic and business policies, whose efficient performance would influence the entire economic activity. The dependence of the country's production on capital goods, raw materials and import intermediary on the one hand, and the large share of these goods in the import on the other hand have highlighted the role of customs in facilitating the productive activities. Facilitating the provision of export goods and services can enhance the productive sectors of exports and realize the plan's objectives.

In connection with the research hypothesis, the following results were achieved based on the output from LISREL:

The factor load of variable formalities on curtailing the transaction costs was 0.14 with significance of 1.59, thus rejecting the first hypothesis concerning the impact of facilitation of formalities on the transaction costs. However, it has occurred in exporting companies located in Gilan and might yield different results in case of other industries and companies. It is recommended to other researchers to focus their studies on other industries as well as by including more companies.

Given factor loading of 0.45 and significant relationship of 4.05, identifying the new opportunities leaves a great impact on reducing transaction costs. Hence, the relationship was confirmed in the conceptual model.

Due to a factor load of 0.49 and significance of 3.99, the third hypothesis concerning the impact of curtailing transaction turnover on the transaction costs was proven.

The factor loading for reducing transaction costs on increasing competitive advantage was 0.89 with a significance of 5.28. Hence, the fourth hypothesis stating the impact of curtailing transaction costs on increasing competitive advantage was proven.

Due to a factor load of 0.67 and significance of 3.93, the fifth hypothesis concerning the impact of increasing competitive advantage on exports development was proven.

The sixth hypothesis was confirmed that according to the results in Chapter 4, a factor load of 0.89 was obtained with significance of 0.67. This implies that reducing transaction costs through exports development mediated the increase in competitive advantage.

9. Recommendations based on research findings

Nowadays, modern technologies have affected nearly every aspect of human lives, leading to dramatic changes in the business arena. Commerce and e-business solutions facilitate the trade, making it possible to complete business processes for export and import at minimal time and cost. Most countries have taken great steps towards electronic customs systems in order to exploit the advantages of modern technologies in trade and with the aim of gaining competitive advantage and facilitating the business transactions. Understanding the significance of these measures in Iran, there have been certain actions taken to implement electronic customs, even though further efforts need to be made until the ideal situation and implementation of electronic customs systems are achieved.

In line with the subject matter of this research, the senior managers and the Iranian customs authorities need to fulfill their obligations and commitments as follows:

- Simplification of customs procedures would provide access to higher levels of security, which in turn will reduce the pressure and lower the costs imposed by electronic invasions.
- The expansion, development and integration of international commercial transactions and increasing cooperation in order to enhance cooperation to standardize processes and information flows aimed at achieving well-defined patterns in models such as the Kyoto Convention (WCO), as well as changes in traditional habits and enhancing the capacity to accept and risk management negligence.
- Practice to win confidence in the use of business information electronically at international level in order to meet the information requirements of customs.

- Access to trusted software systems entailing high capabilities for data processing and easy to use UIs.
- Utilization of the existing capacities in order to improve the smart exchange of information between customs departments at the management level, especially using tools such as source code of items in international transactions for tracking and controlling items.
- Development of cooperation between customs and other organizations involved in international trade in order to facilitate the transmission of information integration International, as well as targeting concepts such as risk and risk-taking in the national and international levels.
- Ensuring the timely update of all rules and definitions related to international trade regularly and consistently to achieve electronic equivalents to concepts such as digital document and signature.
- Preparing the personnel and employees at all levels through the necessary training to acquire the skills needed to operate in an electronic environment.
- It is recommended that a committee be formed of representatives from multiple agencies involved in export of goods and services, so as to research on using IT in all processes related to the export of goods and services. Moreover, the reengineering export processes can digitalize the organizational processes in integrated planning and monitoring.

10. Research limitations

- ✓ Each scientific study comes with its own limitations. In this study, efforts were made to extensively review the literature so as to include electronic customs and export items within the questionnaire. Nevertheless, there may be many other effective items that are not included in the questionnaire.
- ✓ While much of the required data and information obtained through the sources listed, there is no recognized authority in Iran for information and resources available and the papers presented at various scientific fields. Hence, there are numerous limitations to empirical analysis. In addition, this research was limited due to lack of access to many overseas academic research.
- ✓ Given the complexities of the real world, it is impossible and more logical to conduct a study and comprehensive analysis. Hence, it is always essential to consider the abstract facts and complexities of the real world. As a result, the models were somewhat abstract within this study. In other words, the models were constructed based on assumptions simplifying the real world and the relationships between variables. Therefore, effort was made to understand the fundamental relationships between important variables. This only advantage of this action is that research might drift away from reality and achieving the significant relationships.
- ✓ According to the sample, there will be certain limitations on generalizing the results to other organizations and business sectors.
- ✓ The next limitation concerned the structural equation modeling, which means that even if a model is fitted to the data, there might still be other models fitted with the same data. Therefore, the structural fitting may confirm the model while never proving if the model is the sole valid one.

11. Suggestions for future research

- Researchers can adopt this model in different provinces separately, thus exploring the reasons for the success or failure of the electronic customs.
- Other researchers can search and add other variables, designing a more comprehensive model to explain the impact of electronic customs on export products.

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