

Challenges to the single window's implementation within customs services: Algerian case

تحديات تبني نظام الشباك الوحيد على مستوى إدارة الجمارك، حالة الجزائر

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Abstract:

This study presents the challenges to the single window (SW) implementation in Algeria. A thematic content analysis was employed due to the lack of empirical data and restricted information relating to the Algerian case. Findings showed that several challenges hinder the effective implementation of SW including technical and non-technical obstacles. This study is important because it provides relevant theoretical insights for scholars, researchers, and stakeholder about the obstacle hindering SW implementation in Algeria

Keywords: single window, implementation, challenges, Algeria, thematic-content-analysis

JEL Classification Codes: H8

ملخص:

تهدف هذه الدراسة إلى تسليط الضوء على التحديات التي تواجه تبني نظام الشباك الوحيد على مستوى إدارة الجمارك من خلال عرض مختلف التجارب التي تم رصدها في شكل مقالات علمية أو تقارير صادرة عن هيئات دولية مثل المنظمة العالمية للجمارك. ولقد اعتمدنا في هذه الدراسة كما أشرنا سابقا على المنهجية التي تعتمد على تحليل مختلف المصادر العلمية ذات صلة بموضوعنا ومحاولة إسقاطها على حالة الجزائر وذلك نظرا لمحدودية المصادر وصعوبة الوصول إلى إدارة الجمارك في الجزائر

تعتبر دراستنا مهمة نظرا لما تقدمه من تجارب دولية سواء للباحثين أو صناع القرار حول التحديات النظرية التي تحد من تبني نظام الشباك الوحيد وتبنيه في الجزائر وعليه تسهيل التجارة الدولية

كلمات مفتاحية: الشباك الوحيد، تبني نظام الشباك الوحيد، التحديات الجزائرية. المنهج التحليلي

تصنيفات JEL : H8

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INTRODUCTION:

In the era of globalized economies, automated customs systems have become critical tools to improve the efficiency of customs administration. Among these tools, the Single Window (SW) has emerged as a key tool enabling traders to submit documents, paying taxes, and access information through a unified single platform. Therefore, facilitating international trade, enhancing customs procedures, and reducing delays. Through these benefits, the SW becomes a significant tool for trade facilitation.

In Algeria, the introduction of the SW was a part of the national strategy reform, which aims to modernize public services. Within customs administration, the implementation of (SW) aims primarily to reduce delays that traders encounter. Nonetheless, the practical implementation faces several challenges. Evidences from developing countries report that technical challenges such as ICT limitation, non-reliable internet connectivity, legal gaps, and lack of coordination with stakeholder are common challenges that face the implementation. Similar challenges might occur in the Algerian context, these evidence raises concern about the central research question of this study as follows:

What are the main challenges that hinder the effective implementation of the single window in Algeria?

While several studies addressed the challenges of the (SW) implementation in different regions like Morocco, Rwanda, Zambia, and Ghana, few national sources discuss about the obstacle hindering SW implementation. For instance (Ait kheddache , 2023) reported that the customs digitalization in Algeria is experiencing major challenge to achieve full digitalization, however, the study does not delve into details to deeply identify these obstacles .Hence ,this study aims to identify the challenges to the (SW) implementation. It asks :

- 1- What are the global challenges for the SW implementation?
- 2- How can Algeria address these challenges?

To address this research gap, this study uses a thematic content approach analysis using national and international sources, following three major sections:

- Literature review section, discusses prior studies related to our subject.
- Methods, and materials section: explaining the methodological section.
- Findings and discussion section: challenges identification and analysis.

This study is important because the findings give significant theoretical understanding for policymakers, researchers, scholars, and trader community about the challenges that hinder the implementation of the single window system on both international and regional level

1. Literature review

The following section presents the main trends in the single window implementation in the first section, and the identification of core challenges in the second section as follows:

1.1-single window Concept and global trends

The literature review showed that the single window implementation reveals a clear divergence

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in its implementation success from one country to another. To conceptualize, the single window is an electronic system that allows traders to submit documents electronically and pay customs taxes through a single platform; thereby facilitating customs clearance and procedures UNCTAD(2024). However, the implementation of such system can be hindered by major factors such as institutional and technical factors.

The recent report published by the United Nations Conference on Trade and Development in 2024, presents a theoretical systematic framework for the single window system implementation. The report shed light on successful case studies about the system's implementation from countries, using ASCUYADA system, within different customs administrations UNCTAD, (2024)

From a national perspectives, Ait kheddache,(2023), Evaluates the reforms implemented by domestic customs (Algerian customs administration) that aim to facilitate global trade. The author argues that several measures are applied within customs administration to expedite customs procedures, hence promoting exports, such as the use of orange, red, and green lines for goods clearance.in addition to customs regimes measures, and authorized economic operators (AEOs). However, despite the presence of these facilitations, customs procedures in Algeria still face high complexities; mainly due to the reliance on manual practices within customs administration. Thus, the implementation of an integrated customs system is imperative to facilitate customs procedures in Algeria. This point of view is supported by Boulares,(2022), who examines the challenges that impede exporting in Algeria through boarder lenses, by analyzing different report related to Algerian foreign trade. The authors argues that , despite the efforts made by the Algerian government to improve exports, it still face significant challenges especially those related to international policies and measures such as the African continental free trade zone (AFCFTA).

Neighboring countries made significant progress in the single window implementation .Rachidi et al(2022) showed that the integration of the single window system had a postive impact on reducing the procedures delays , and streamlining documents reflecting a significant step towards customs dematerialization. Nevertheless, technical challenges including the non-integration of the formalities in the single window system continue to hinder the full facilitation of goods movement.

In contrast to North African countries, Nkundabaramye (2022), showed a high score in the implementation of a national single window in Rwanda (RESW), reflecting the possibility of achieving such process. However, in the Zambian experience showed a weak experience , where (Kanyinji et al., 2021)showed that while institutional and regulatory reforms (trade reforms) are strongly implemented within Zambian customs administration, adoption challenges related to the lack of single window performance still hinder the adoption process .

Through another specter, the study by Aryee et al,(2022) at Tema port in Ghana demonstrate that the primary challenges are not technical but institutional obstacles to trade facilitation including bureaucracy; fragmented governmental structures and agencies, and stakeholders' participation.

1.2-potential challenges to the single window implementation

As previously discussed, the implementation of the single window system can be hindered

by several challenges , diverging from technical , to human capacities and institutional barriers, in this section, we'll address these obstacles by dividing them into two groups : technical barriers and non-technical barriers as follows :

1.2.1- technical barriers

The implementation of a successful single window system is highly related to the availability of strong technical factors, such as recent technological systems to ensure smooth customs procedures, thus facilitating customs tasks, and streamlining customs clearance. In contrast, in several developing countries, where updated systems are lacking, the implementation of a single window system faces significant challenges mainly due to the use of legacy systems within customs administration:

a- Legacy system (LS)

According to Brodie and Stonebraker (1995), legacy systems can be defined as any system with more than ten years (10) of deployment that has been built using old technologies and programming languages. While Brodie and Stonebraker (1995) defined (LS) relying on the information system perspective, Wang, Hu et al(2007) characterized (LS) by resistance to change and interoperability with new systems. This resistance is mainly driven by the significant organization's dependence on the data stored within these systems. In the context of the single window implementation, the previous definitions are relevant, leading to a significant obstacle, which is an “outdated systems are not only” a legacy system" but also a critical impediment to the success of the single window implementation".

b- Internet connectivity

In the era of digitalization, strong internet connectivity is critical to ensure the effectiveness of public organizations, and expedite service delivery. Nonetheless, several countries are still struggling with weak internet connectivity, especially in developing nations. In this context, the World Bank (2023) reported that only 35% of people have access to internet in developing countries. Similarly a report published by GSMA group (2023), highlighted low internet connectivity in sub-saharian countries , where only 28.5% of individuals have access to the internet.

From a regional perspective, North African countries are experiencing modest progress in internet connectivity ,where the article published by GSMA group (2024) indicates improvements in internet speed in Egypt , Morocco ,and Algeria. However, despite these efforts , there is room for improvement to enhance internet connectivity , especially in optic fiber technologies , where some north African countries can not afford it due to the high costs. Therefore, a significant challenge is identified : the single window implementation does not merely rely on new software availability, but it is essentially depending on high-quality internet connectivity, particularly in remote border areas, which are usually characterized by low internet connexion , therefore impeding data exchanges and delaying customs procedures in these zones.

C-cyber security and data protection

The availability of sensitive trade data does not only make the single window system implementation more efficient, but it also exposes governments to critical cyber-security threats. According to the international association of Ports and Harbors(2021), several cases were exposed in different countries, where notable stakeholders around the world reported multiple cyber-attacks during COVID- 19 pandemic against the maritime industry; which

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ultimately led not only to data vulnerability but also hindered the flow of goods and delayed customs procedures. Therefore, developing a robust national cybersecurity strategy is not optional, but imperative to increase cyber resilience across private and public organizations. This strategy should align with international norms and standards regarding cybersecurity and data protection such as the three pillars recommendations published by the World Economic Forum(2014) including: (1)information sharing between sectors to prevent threats, (2) improving the ability to protect sensitive organizations (e.g.,customs, health and finance),and(3) strong legal framework development. Although, the report was published in 2014, these recommendations are lacking in different developing countries such as Algeria.

1.2.2-Non-technical barriers

While several governments tend to resolve technical obstacles for the single window implementation, the efforts are pointless if the legal, human capacity, stakeholder engagement, and financial challenges are not addressed simultaneously with the technical barriers previously discussed. Hence, this section aims to identify the non-technical barriers as follows:

A- Legal framework

A significant non-technical barrier emerges from the absence of an adequate legal framework to ensure single window functioning. The (UNCE, recommendation , n°=33,2015) emphasizes that the single window environment is defined as a series of measures that should be taken to resolve juridical situations related to the national and international commercial data exchanges which are necessary to the single window functioning such as:electronic signature , user authentication ,storage and data exchanges. This definition is further elaborated by the (WCO, 2017), which a significant guideline for governments to build a strong legal environment for the SW functioning was proposed following four fundamental pillars as follows: (1) legal definition,(2) participants governmental agencies are defined by the law,(3) data exchanges regulation,(4) legal interoperability i.e the system is legally valid.

For many developing countries , establishing a strong legal framework for the SW function remains a critical challenge.This difficulty arises from the outdated legislations that fail to recognize electronic systems and transactions , hence creating a major legal gap and uncertain environment that directly impedes the SW implementation.

B-Capacity building

The effectiveness of the SW implementation depends not only on a strong legal framework, but also on capacity building in public and private sectors. In this realm, the (WCO, Capacity Building, nd) defined the capacity building as "the ability of customs administration to create and manage policies to meet with national and international norms, as well as the capability to implement them within administrations to meet with these standards." In practice, capacity building depends on policy capacity such as creating and managing rules and

operational capacity like the availability of the right tools, human capital (e.g. skilled officers) to apply and ensure these rules, especially in the digitalized environment.

Nonetheless, several developing countries are struggling with low capacity building performance. Reports from the African Capacity Building Foundation (ACBF) indicated that the majority of African nations fall into the low-to-medium capacity building (Chrysostome, Munthali, and Ado, 2019). These weaknesses arise from the lack of political will, weak leadership, and strategic reforms that aligned with the real needs and sustainable development. Additionally, weak partnership, directly affect the effective and sustainable SW implementation.

C-stakeholder participation

In the context of administration, the Economic and Social Commission for Asia, and the Pacific (ESCAP, 2018), defined Stakeholder participation as engagement of people, individuals or political entities, to achieve a common objective. The definition emphasizes the participation of stakeholder in decision-making and their effective involvement to reduce the burdens of the government.

In the context of the single window (SW), stakeholder participation is a critical pillar for ensuring its implementation. In this context, The United Nations of Experts for Paperless Trade in Asia and the Pacific (UNNEXT, 2011), highlighted the importance of stakeholder involvement from two perspectives : governments , and traders, demonstrating that failure occur often from lack of trust in the system from traders , and resistance to change from government agencies.

To overcome these barriers ,the UNNEXT provides six key strategies : (1) strong political will ,(2) strong lead authority mandated by the law,(3)strong stakeholder engagement by involving all trade participants,(4) strong inter-agency collaboration ,(5) clear scope of the SW concept , and (6) strong communication channels.

Despite these recommendations, several developing countries particularly in Africa are still struggling with the implementation of SW .This ongoing failure is mainly due to the lack of stakeholder involvement and collaboration, that occur from several obstacle such as : lack of understanding about the SW system and fragmented programs for stakeholder engagement. Thereby creating persistent gap between the government's modernization efforts and effective stakeholder participation.

D-implementation costs

One of the non-technical challenges the affect the single window (SW); the financial costs are a significant challenge to consider. The costs of the implementation vary across countries and administrations. In this context, the Organization for Economic Co-operation and Development (OECD, 2018) revealed the common expenditures of the SW implementation as follows: (1) regulatory costs involving the work of ministries bodies and agencies to revise or add new legislations ; (2) institutional costs: the need of implementing new institutions (e.g. post clearance unit) , new staff ; or for the existing personal ; (3) costs for staff training; (4) equipment and infrastructre costs such as software, hardware and ICT technologies ; (5) awareness-raising costs related to the techniques used to raise stakeholder awareness of the SW implementation.

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Additionally, The OECD case studies revealed that among 24 surveyed developing countries, trade facilitation implementations including SW systems do not require high costs. Among these expenses, the information and communication technologies (ICT) represent the major part of the expenditure, while the other expenses are distributed across requirements, training, and systems maintenance. Thereby, the implementation of the SW system in African countries does not only rely on financial ability but also on the effective coordination between governments and stakeholders to ensure the efficient financial management.

2-Methods and Materials

The methods and materials used are presented as follows

2.1-research design

This study aims to examine the challenges hindering the single window (SW) implementation in Algeria using a desk-based thematic content analysis. This methodology was adopted because empirical data related to customs modernization are restricted, and access to Algerian customs authorities remains a significant challenge. Therefore, the analysis relies exclusively on secondary data published between 2015 and 2025.

2.2-data sources and selection

To ensure transparency, we used the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) approach to document how the selection of the data using the PRISMA framework, following four steps (Figure1)

A-Identification: A total of 38 sources were collected through several databases including: World Customs Organization (WCO), the World Trade Organization (WTO), United Nation Conference on Trade and Development (UNCTAD), the Algerian Scientific Journal Portal (ASJP), National press website such as Algerian Press Services (APS).

In the research, we used a combination of keywords including: "single window", "single window AND implementation", "WTO single window", "single window And Algeria"

B-Screening: The sources were selected using 04 pre-defined criteria as follows:

(1) Relevance to our study; (2) English or French language; (3) source availability: full text available; (4) Published date between 2015 and 2025.

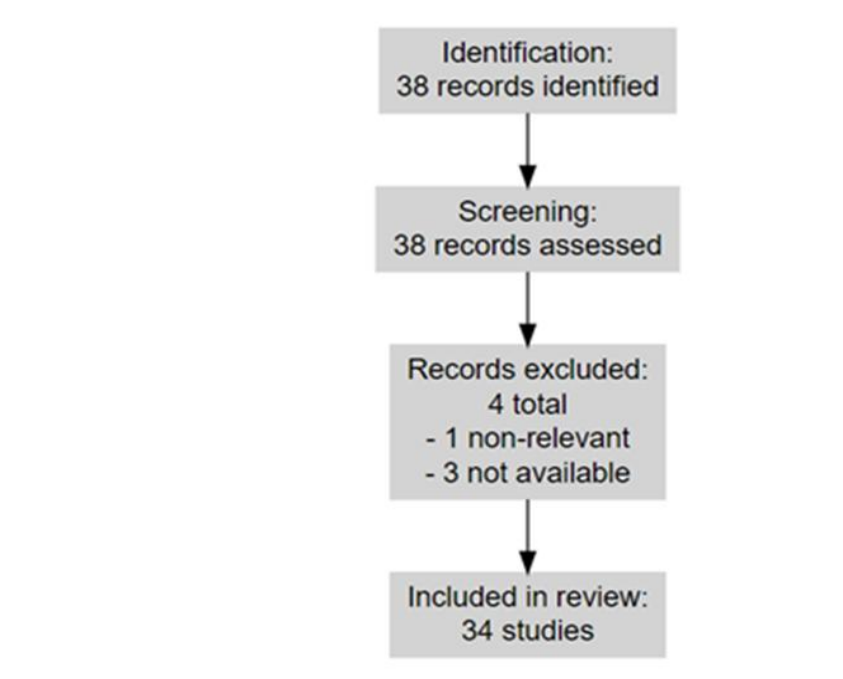
C-Selection: During this phase, sources that were not relevant, published in different language or outside the range (2015-2025) were excluded.

D-Included sources: A final output of 34 sources was selected for the review.

The selected sources were pre-classified by 05 categories: (1) International reports: (WCO, WTO, and UNCTAD...etc. publications), (2) National websites: Algerian

websites,(3)academic studies: Articles, conference papers, national and international...etc.,
(4) International case study: reports or publications, exposing an international or regional case relevant for our study,(5)Institutional reports: national or international reports published by public or private foreign institutions such as Asian Development Bank (ADB).

Figure (1): PRISMA Diagram Flow



Source: By authors, realized by Rstudio

2.3-Data analysis: The selected sources were analyzed using a thematic content approach following three phases:

A-sources familiarization and pre-coding initiation: all the sources were read carefully, and, a thematic code was attributed for each sources, for example: outdated system = legacy system, lack of training = capacity building, rigid legislation = legal challenges...etc.

B-grouping and coding: Following the pre-coding phase, the sources were grouped by the following challenges categories: (1) Legacy system;(2)Internet connectivity;(3) Cybersecurity and data protection; (4)Legal challenges;(5)Capacity building;(6) Stakeholder participation, and ,(7)Implementation costs.

C-coding revision: In this phase, the grouped sources were revised to ensure coherence and validate the coding and the grouping realized in the previous steps.

D-Tools used: To conduct this study, three tools were used: Zotero, Rstudio, and Microsoft excel 2013:

- Zotero: used to import, classify, and manage the data by authors, years, and source.
- RStudio: clean the dataset, classify each source by challenges, visualizing the frequency of the challenges chart, and, generating PRISMA diagram,
- Microsoft Excel (2013): displays the uploaded file from Rstudio, check the sources classification, and structures the tables.

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3-Results and discussion :

The results of the study are presented as follows:

3.1-Sources distribution and classification

In this section, all the sources are analyzed, and distributed using Rstudio (Figure2); with (Table 1) presenting their classification following the challenges previously identified.

3.1.1-Sources distribution

Figure (2) shows the distribution of the data used as follows

Figure (2): Sources distribution

Type	Count	Percentage
<code><chr></code>	<code><int></code>	<code><dbl></code>
1 Academic study	18	52.9
2 International report	6	17.6
3 International case study	5	14.7
4 National website	3	8.82
5 Institutional report	2	5.88

Source: By authors; realized using RStudio

The Figure (2) presents the distribution of the selected sources. The results demonstrate that the academic studies (articles, peer-reviewed, conference papers,...etc.) represent 52.9% of all the selected sources, while international reports constitute 17.6%,international case studies 14.7%,national websites 8.82%,and institutional reports 5.8%.Therefore,our study heavily relies on academic studies and international reports. Hence, balancing between the theoretical and practical backgrounds of the challenges to the SW implementation.

3.1.2-Sources classification (by challenges)

Table (1) presents the sources used in this study categorized into seven major challenges as follows:

Table (1): sources classification by challenges

<u>Challenge</u>	<u>Source</u>
<u>Implementation costs</u>	<u>(International Trade Administration, 2021)</u>
	<u>(Heinesson, P, 2016)</u>
	<u>(Shepherd,Kumar& Dime, 2018)</u>

	<u>(Yaw, 2016)</u>
	<u>(Benhayoun, 2019)</u>
	<u>(Laktos, 2016)</u>
<u>Legacy Systems</u>	<u>(International Trade Administration, 2024)</u>
	<u>(International Trade Administration, 2021)</u>
	<u>(ASYCUDA, 2024)</u>
	<u>(Aryee, Andersen & Hansen, 2016)</u>
	<u>(Jeevan, Bin, Othman et al, 2021)</u>
	<u>(Thu & Thanh, 2021)</u>
	<u>(Mezghan, 2018)</u>
	<u>(Benhayoun, 2019)</u>
	<u>(Zerigui&Nadi, 2025)</u>
	<u>(Laktos, 2016)</u>
<u>Internet Connectivity</u>	<u>(International Trade Administration, 2024)</u>
	<u>(ASYCUDA, 2024)</u>
	<u>(Peynirci, 2021)</u>
	<u>(Algerie Invest, 2024)</u>
	<u>(Zerigui&Nadi, 2025)</u>
<u>Cybersecurity & Data Protection</u>	<u>(Algerian Press Services, 2015)</u>
	<u>(Colesky & Raath, 2015)</u>
	<u>(Nkundabaramye& Mom -Aloysius, 2022)</u>
<u>Legal Challenges</u>	<u>(UN Trade and Development (UNCTAD), Policy Hub, 2022)</u>
	<u>(Radio Algerienne, 2021)</u>
	<u>(Ndonga, 2017)</u>
	<u>(WTO, 2015)</u>
	<u>(Jones, 2021)</u>

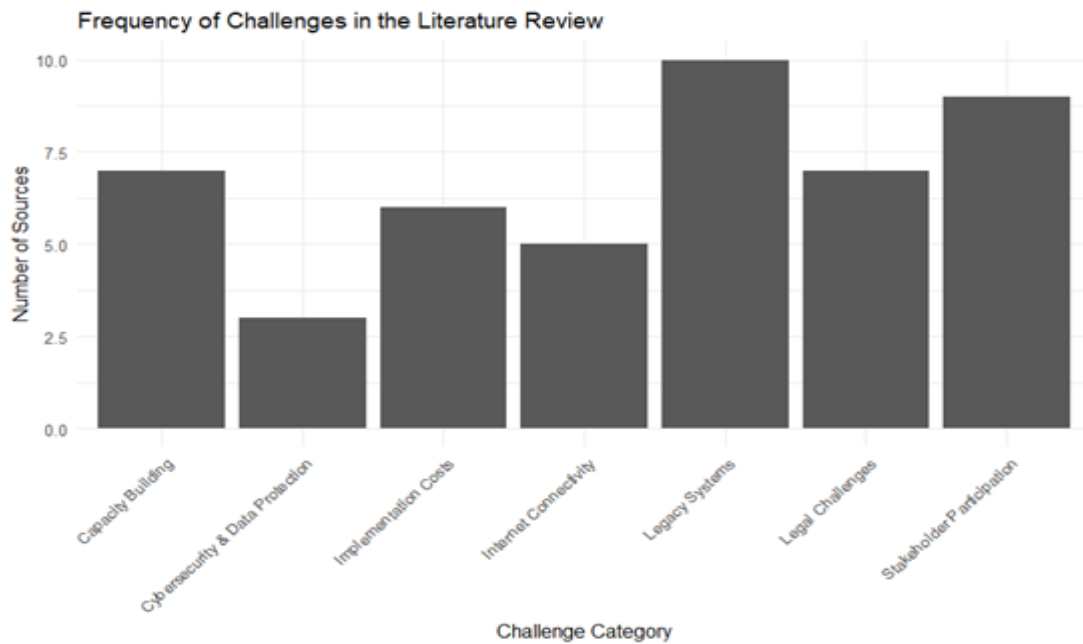
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	<u>(Yean, 2017)</u>
	<u>(Laktos, 2016)</u>
<u>Capacity Building</u>	<u>(Indira & Kusumasari, 2020)</u>
	<u>(Vorotyntseva, Levinskaya, Skudalova et al, 2020))</u>
	<u>(Syofyan, Azizah, Al Akayleh et al, 2023)</u>
	<u>(Thu & Thanh, 2021)</u>
	<u>(ASYCUDA, 2024)</u>
	<u>(Remali and Madzli ., 2018)</u>
	<u>(Rwanda Revenue Authority, ND)</u>
<u>Stakeholder Participation</u>	<u>(International Trade Administration, 2021)</u>
	<u>(UN Trade and Development (UNCTAD), Policy Hub, 2022)</u>
	<u>(WCO, Egypt adopts innovative trade document exchange system, 2022)</u>
	<u>(Rwanda Revenue Authority, ND)</u>
	<u>Syofyan, Azizah, Al Akayleh et al. (2023)</u>
	<u>(Akbar, Mendoza, and Febriansyah, 2025)</u>
	<u>(Walusimbi, 2025)</u>
	<u>(Mezghan, 2018)</u>
	<u>(Li, 2025)</u>

Source: By authors

The table (1) presents the classification of all the sources used in this study, across the seven challenges defined in the methodology section. Results showed that, the majority of studies focus on the legacy system and capacity building barriers, acknowledging the importance of the ICT technologies and human factors needs. Fewer studies discuss the cybersecurity, internet connectivity, legal challenges and, stakeholder participation (see Figure 3). This classification offers theoretical insights about the main barriers for the single window implementation in Algeria.

Figure 3: Frequency of the challenges in the literature



Source: by authors, realized by Rstudio

3.2-Discussion

The sources selected for the literature-identified major obstacles that might hinder the effective implementation of the single window in Algeria. Despite results showed a major focus on legacy systems and stakeholder engagement, other factors must be considered to ensure the sustainable (SW) implementation. These challenges are discussed as follows:

-Legacy system: Results indicate that legacy systems constitute one of the major obstacles to the single window (SW) implementation. In Algeria customs administration relied on outdated systems for more than two decades to manage customs activities, (Zerigui&Nadi, 2025) highlighted the failure of customs modernization efforts. This conclusion is consistent with the findings reported by (Ait kheddache Jugurta, 2023);emphasizing that the Algerian customs services still heavily depending on manual practices and fragmented procedures.Similar trends were also observed on the international level. Both (ASYCUDA, 2024) and (UNCTAD, 2024), highlighting the need of modern ICT infrastructures to ensure interoperability ,and meet the requirement of the single window implementation.This finding highlghtes the importance of updated ICT infrasturcutures to ensure the effective SW implementation in Algeria.

-Internet connectivity :The findings about internet connectivity align with the literature. (UNCTAD, 2024),highlitghted that one of the key obstacle faced in the SW implementation was the lack of reliable internet connectivity.From regional perspectives ,(Loubna Rachidi et al., 2022) highlitghed that the effective implmentation of SW does not only rely on internet connectivity, but also on systems integration to ensure the full customs procedure digitalization.This findings provide a key lesosn for Algeria: addressing both internet connectivity,and systems integrity is essential to achieve the full advantages of SW system.

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-Cybersecurity and data protection: The challenge of cybersecurity and data protection challenge has been cited by limited sources in the literature, reflecting the lack of academic papers related to cybersecurity and data protection ,and an existing gap in the SW implementation.Internationally, (UNCTAD, 2024) underscored the importance of implementing effective laws related to the electronic information exchanges such as electronic signature , which constitute the components of cybersecurity and data protection, as a central requirement for the SW implementation.While Algeria made some progress in the cybersecurity and data protection field through the enactment of the data protection law in 2018(ANDP, 2018), the SW requires technical aspects to take into consideration such as ICT infrastructure security.Hence, both legal and technical factors must be treated to ensure a full protection, and raise trust among users.(Boukhari,2022)

-Legal challenges : Results demonstrate that legal challenges were not among the dominant categories cited in the findings (Figure 3),which contrasts with the literature.(Aryee&Hnasen, 2022) highlight that fragmented agencies ,and political interference are key factors that face the effective SW adoption,by creating fragmented laws and regulations.This evidence aligns with (Kanyinji et al., 2021),who underscore the misalignment between national laws and SW legal requirements.These findings are relevant for Algerian policymakers as legal challenges are central key to consider for SW implementation.In case of legal misalignment,Algeria risks conflict in laws application,which may delay customs procedures.

-capacity building : findings show that considerable number of literature cited the capacity building challenges.This finding strongly aligns with the literature.The results reported by (Ait kheddache Jugurta, 2023) highlights that Algerian customs administration is still depending on manual procedure, reflecting weak capacity building efforts including : skilled personnel and limited ICT availability tools to manage SW effectively.A similar result was observed in Zambia, (Kanyinji et al., 2021) emphasize that customs officers must be adequately trained to manage SW system.Additionally,ICT limitation represent one of the operational challenge that hinder officers ability to use tools and manage SW.Hence,Algeria has to address the capacity building gap, to leverage full advantage of SW.

-stakeholder participation : Stakeholder participation challenges were cited by major sources, ranked just after legacy system,highlithing the acknowlegment of involving customs, traders ,importers, exporter..etc.in (SW) implementation.For instance,(Boulaaras, 2022) reported that Algeria still faces several challenges in the implementation of African trade agreement.These obstacle, indirectly require addressing stakeholder participation .Moreover,(Aryee&Hnasen, 2022) reported that stakeholder participation are a pivotal to ensure collaboration between agencies and trade community.These findings provide the need for Algeria to reinforce collaboration between the governments ,stakeholder,and trade participants, to ensure the effective implementation of (SW)

-implementation costs: Figure (3) demonstrates that the implementation costs are cited by notable sources.This evidence aligns with international publication where (UNCTAD, 2024) emphasizes the need for sustainable funding for both the implementation ,and the maintenance of (SW).Although, the implementation costs is widely recognizedas one of the challenges to

the (SW) implementation, few national sources discuss about it , reflecting the presence of a significant gap that Algerian policymakers need to address.Strategic funding are fundamental to ensure the full and sustainable deployment of the (SW) system.

conclusion

This study aims to analyze the challenges that hinder the effective implementation of the single window (SW) with a focus on the Algerian case, following legal, operational, and technical aspects .Finding show that Algeria face major technical challenges such as legacy system, non-reliable internet connectivity, and lack of cybersecurity and data protection consideration. In addition to non-technical barriers such as legal gaps, and weak stakeholder engagement .While the implementation costs are one of the main challenges internationally recognized, national sources do not discuss it, hence raising concerns about the funding that ensure the effective implementation of (SW).These challenges further delay customs procedure even though the partial implementation of the system within customs administration.

To leverage the full benefits of the (SW) in Algeria such as time and costs saving, streamlined customs procedures, and fast clearance, Algerian policymakers need to strategically address the challenges previously identified, through legal reforms, more investments in the ICT sector, targeted capacity building programs, and effective collaboration with stakeholder.

Further studies are recommended to address the limitation of this study such as the connection between the challenges identified.

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