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The Effect of Customs and Tax Digital Operations on Jordanian Customs Performance Towards Sustainability

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A B S T R A C T

This research aims to explore the influence of digital customs and tax operations on the performance of the Jordanian Customs Department and their contribution to sustainability. With the descriptive–analytical method, data were gathered by a structured checklist and analyzed in SPSS and Smart-PLS 4. The results indicate that customs and tax e-services (such as paperless clearance and e-gov) have a positive and significant impact on customs functioning. It was also discovered that the customs performance in turn positively impacted sustainability, thus indicating that it is indeed an essential catalyst of efficiency and sustainable growth. In mediation analysis, the finding is robust that the influence of digital operations on sustainability is primarily through the improvement of performance, and it verifies the partially mediating effect of customs performance. This finding is consistent with prior studies, which highlight the significance of technology adoption and institutional efficiency in facilitating trade, and offers new evidence from the context of Jordan. The paper provides theoretical and practical implications, revealing the mediating role of performance, extending the resource-based view and agency theory, and generating policy recommendations for the enhancement of digital customs reforms and sustainability strategies.

JEL Classification: *O33, Q56, H21, H26, & H83.*

1. Introduction

The effectiveness of customs services is a critical factor in the prevailing global trade system. In an environment with more regulations and the need for faster processing, customs administrations are constantly under pressure to perform better and to ensure smooth trade flows. This paper examines several hypotheses that link customs and tax operations to the overall performance of customs, specifically the implications concerning customs performance on customs clearance, on e-government initiatives, and their joint relationship with performance outcomes. The first hypothesis is that customs and tax operations are positively related to customs performance. Since customs administrations process a significant portion of

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world trade, the smooth operation of services is crucial for improving the performance of the organization (World Customs Organization, 2020). The second one is that the clearance act itself has a direct and positive effect on performance, as when customs clearance processes are efficient, they cut through delays and ensure compliance with otherwise possible violations (Bichou & Gray, 2004). E-government programs, lastly, are believed to have a positive impact on customs performance, as digital technologies are anticipated to contribute towards greater transparency, lower transaction costs, and better communication among stakeholders (OECD, 2016). Although these were expected, the business world is characterized by rapid technological evolution and changing customer demands, and customs need to position itself strategically in this environment. Existing studies underline the relevance of enhancing customs and tax operations to unlock supply chain efficiency. For example, Vershitsky et al. (2024) reveal that improvements in the customs process will help to reduce clear time and cost, thus increasing customer satisfaction. But the advances are regularly undermined by structural barriers, including corruption, poor use of technology, and deficits in the logistics capacity of customs authorities. Likewise, Al-Zaqeba et al. (2023) mention that although efficient customs clearance is crucial for reducing delays, obstacles like strict local policies or a lack of training among customs officials continue to be prevalent. These challenges signal the importance of critically considering how digital operations can be embedded and endured in practice.

The modernization of customs through the digitization of procedures has been regarded as a linchpin in current trade facilitation. Worldwide evidence indicates that incorporating new technologies (namely, electronic clearance systems, big data treatment programs, and e-government platforms) can most certainly improve transparency, efficiency, and responsiveness (Świerczyńska, 2023; Heijmann et al., 2020). Customs are not only responsible for revenues and law enforcement, but also contribute to trade facilitation and the continuity of supply chains. Studies by Bassa et al. (2021) and Shtrikov et al. (2022) further verify that digital solutions decrease transaction costs, speed up clearance, and enhance service quality, leading to better institutional performance.

In Jordan, customs modernization is gaining relevance in the national digital transformation program. The Jordanian Customs Department is caught between trade facilitation and strong regulation. Digital customs systems, for instance, e-clearance systems and integrated information systems; offer possibilities to reconcile these demands by simplifying procedures, ensuring that data are of higher quality, and strengthening collaboration with supply chain parties (Mazurenko et al., 2021; Nugraha & Ruldeviyani, 2024). However, the integration of such systems has been uneven, and there are persistent questions about their effectiveness in generating both performance and sustainability benefits. Despite global momentum toward digitalization, inefficiencies continue to challenge many customs administrations in developing economies. Persistent issues include delays in clearance, poor data management, and limited service quality, all of which undermine trade facilitation (Nguyen & Mac, 2021). Moreover, although digitalization is widely promoted as a reform strategy, its direct and indirect impacts on sustainability are less frequently examined. In the context of customs, sustainability encompasses more than environmental outcomes such as reducing waste and emissions; it also includes economic sustainability (through cost reduction and competitiveness) and institutional sustainability (through efficiency, compliance, and transparency) (Heijmann et al., 2020; Świerczyńska, 2023). Most prior studies have concentrated on developed regions such as the European Union and the Netherlands (Heijmann et al., 2020) or focused narrowly on specific reforms such as paperless clearance (Bassa et al., 2021) and service quality (Shtrikov et al., 2022). While these studies offer valuable insights, they provide limited evidence on how customs performance mediates the relationship between digital customs operations and sustainability. In Jordan, in particular, there is a lack of empirical research that systematically examines this linkage. Without such evidence, policymakers may be unable to assess whether digital reforms deliver not only efficiency but also broader sustainability benefits.

This study addresses the identified gap by offering both theoretical and practical contributions. First, it empirically tests the effect of customs and tax digital operations on customs performance, building on prior research that emphasizes the role of technology adoption and process optimization (Mazurenko et al., 2021; Bassa & Kamewor, 2021). Second, it evaluates the direct effect of customs performance on sustainability, thereby responding to calls for more research on the translation of efficiency gains into sustainable outcomes (Heijmann et al., 2020; Song & Lee, 2022). Third, the study introduces a mediation model where customs performance acts as a bridge between digital operations and sustainability. This approach fills an important

gap by recognizing institutional performance as the missing link between technological adoption and long-term outcomes. Finally, the research contributes practically by providing evidence-based recommendations for Jordanian policymakers and customs authorities on how to leverage digital transformation for both efficiency and sustainability.

2. Literature Review

The literature on customs and tax operations highlights the growing importance of digital transformation, institutional performance, and sustainability in shaping the effectiveness of customs administrations worldwide. With globalization and increasingly complex supply chains, customs authorities are no longer limited to revenue collection and border protection; they now play a central role in trade facilitation, efficiency enhancement, and sustainable economic development (Świerczyńska, 2023; Heijmann et al., 2020). Recent studies show that customs performance is strongly influenced by technological innovations such as paperless clearance, data quality management, and e-government systems, all of which enhance transparency, accuracy, and collaboration with stakeholders (Bassa et al., 2021; Nugraha & Ruldeviyani, 2024; Shtrikov et al., 2022). At the same time, improvements in customs operations have been linked to sustainability outcomes, including reduced delays, optimized resource use, and strengthened institutional trust (Mazurenko et al., 2021; Gani & Azmat, 2023). However, much of the existing research focuses on advanced economies or isolated aspects of customs modernization, leaving limited evidence on how digital operations translate into sustainability outcomes in developing contexts such as Jordan. This chapter therefore critically reviews the existing body of literature, focusing on three interrelated areas (customs and tax digital operations, customs performance, and sustainability) while identifying gaps that this study aims to address.

The existing literature highlights the evolving role of customs and tax operations in driving performance and sustainability within global trade systems. Early work by Bichou and Gray (2004) emphasized the importance of efficient customs clearance and port operations as integral components of logistics and supply chain performance, stressing that streamlined processes directly reduce delays and enhance trade competitiveness. Building on this, the OECD (2016) argued that e-government initiatives have become essential tools for modernizing customs administrations, promoting transparency, and improving service delivery. This perspective was echoed by the World Customs Organization (2020), which identified digital transformation as a central pillar in enhancing customs performance and facilitating international commerce. Recent scholarship has provided empirical evidence of these claims. Świerczyńska (2023) demonstrated that digitalization of customs procedures contributes significantly to improving the efficiency and reliability of global supply chains, while Heijmann et al. (2020) underscored the changing role of customs in aligning with broader supply chain and information management strategies.

Within emerging and transitional economies, scholars have drawn attention to both opportunities and challenges. Vershitsky et al. (2024) highlighted how economic security and external pressures shape customs performance, particularly in contexts facing international sanctions, while Al-Zaqeba et al. (2023) showed that integrating customs intelligence and risk management can enhance sustainable supply chain practices in Jordan. Similarly, Mazurenko et al. (2021) explored the opportunities and challenges of digital customs transformation, noting that while technology adoption improves efficiency, barriers such as infrastructure gaps persist. Nugraha and Ruldeviyani (2024) provided further evidence from Southeast Asia, illustrating that digital customs reforms contribute directly to sustainable trade facilitation. Complementary studies by Shtrikov et al. (2022) stressed the importance of assessing service quality in digital customs, while Song and Lee (2022) empirically linked customs and logistics performance to broader trade outcomes in South Korea. Finally, several contributions have directly tied digitalization to measurable performance improvements. Bassa and Kamewor (2021) found that paperless customs clearance positively affects trade facilitation by reducing processing times and improving stakeholder coordination. Similarly, Gani and Azmat (2023) confirmed that logistics performance and trade volumes are increasingly dependent on digital transformation, particularly in developing economies. Collectively, these studies demonstrate a clear trajectory in the literature: customs digitalization and modernization are consistently associated with improvements in performance, efficiency, and sustainability, although challenges remain in fully realizing

their potential across diverse economic contexts.

2.1 Customs and Tax Digital Operations

The digitalization of customs and tax operations has increasingly been recognized as a strategic driver of efficiency, transparency, and sustainability in global trade. Recent studies emphasize that customs systems are no longer static institutions; instead, they are evolving into adaptive and technology-driven entities that must respond to fluctuating supply chain demands and global uncertainties. Świerczyńska (2023) underscores this point in her study of the European Union customs system, arguing that customs administrations must remain flexible and professional in order to ensure compliance and efficiency. Her findings stress that cooperation with supply chain stakeholders and the integration of modern technologies not only accelerate clearance processes but also mitigate the risks posed by regulatory changes, security threats, and technological complexities. This perspective is particularly relevant for developing economies such as Jordan, where customs modernization is still in progress, and highlights the need for adaptability to ensure trade competitiveness. Building on this, Heijmann et al. (2020) argue that the role of customs is undergoing a structural transformation as a result of innovations in information technology and supply chain oversight. Their study draws attention to the World Customs Organization's (WCO) framework, which promotes secure and efficient global trade through mechanisms such as authorized economic operators and data-driven oversight. The Dutch Customs Administration, for example, has adopted big data analytics, data pipelines, drones, and mobile applications to enhance monitoring and improve the precision of inspections. While Świerczyńska (2023) emphasizes cooperation and professionalism as enablers of performance, Heijmann et al. (2020) highlight technological innovation as the main catalyst for transformation. Taken together, these studies indicate that customs performance is contingent on both human capital development and digital transformation, suggesting that technology alone is insufficient without institutional adaptation and stakeholder collaboration.

Empirical evidence from emerging economies also illustrates the tangible benefits of customs digitalization. Bassa et al. (2021) demonstrate that the implementation of paperless customs clearance in Ghana significantly reduced transaction costs, minimized delays at ports, and strengthened supply chain relationships. Their findings show that information technology is not simply an administrative upgrade but a mechanism for positioning Ghana as a regional transportation hub. Similarly, Bassa and Kamewor (2021) argue that information technology improves data quality and accuracy in customs clearance, which in turn speeds up processes and reduces errors. These studies contribute valuable insights for countries like Jordan, where paper-based customs procedures still create inefficiencies. However, one limitation of these works is that they focus mainly on operational improvements and less on the long-term institutional and sustainability impacts of digital operations. Other scholars have explored the systemic and organizational implications of customs digitalization. Mazurenko et al. (2021) developed a simulation model of a cargo customs complex, showing that customs clearance facilities function as critical links in the logistics chain. Their findings revealed that bottlenecks, such as insufficient inspector capacity, significantly constrain performance, and that organizational restructuring can greatly enhance efficiency. This highlights the importance of aligning digital operations with institutional design, rather than viewing technology as a stand-alone solution. Similarly, Nugraha and Ruldeviyani (2024) emphasize the role of data quality management in customs, demonstrating that accuracy and reliability of data directly influence clearance efficiency and decision-making. This adds a critical dimension to the debate, as it shows that without reliable data management systems, even the most advanced digital solutions may fail to achieve their intended outcomes. The quality of customs services is also central to the effectiveness of digital operations. Shtrikov et al. (2022) adopt a consumer satisfaction model to evaluate the quality of customs services, finding that service quality improvements—such as better monitoring systems and methodological support—directly enhance performance. While this study does not focus exclusively on technology, it suggests that digital tools can enhance customer satisfaction only when accompanied by organizational reforms that prioritize service delivery. This complements the perspectives of Świerczyńska (2023) and Heijmann et al. (2020), reinforcing the notion that successful digital transformation requires both technological integration and institutional capacity building. Finally, broader evidence on digital transformation highlights its potential for reshaping trade and logistics. Moldabekova et al. (2021) and Richnák (2021) show that digital technologies improve

real-time shipment tracking, responsiveness to market demands, and overall logistics efficiency, while Afonasova et al. (2019) emphasize the role of digital innovation in fostering transparency and improving border control. Although these studies do not exclusively address customs operations, their findings confirm that digital transformation provides customs administrations with strategic resources for enhancing competitiveness and achieving sustainability. Thus, the literature provides strong evidence that customs and tax digital operations positively affect customs performance by reducing costs, improving efficiency, and enhancing service quality. Yet, critical gaps remain: while developed economies focus on advanced technologies such as big data and drones, developing economies struggle with basic issues of data quality, institutional capacity, and service delivery. For Jordan, this highlights the urgent need to not only adopt digital technologies but also strengthen organizational structures, stakeholder cooperation, and data governance to maximize the benefits of digital transformation.

2.1.1 Customs Clearance

Customs clearance is one of the most critical aspects of customs operations, as it directly affects trade facilitation, supply chain efficiency, and overall customs performance. The literature consistently shows that the modernization of clearance processes (particularly through digitalization and data-driven methods) enhances efficiency and reduces delays. Mazurenko et al. (2021) developed a simulation model for cargo customs complexes, treating clearance facilities as integral nodes in logistics supply chains. Their findings revealed that bottlenecks, such as limited inspector capacity, significantly constrain performance, while organizational optimization can substantially improve efficiency. This highlights the importance of aligning digital clearance systems with institutional structures, as technology alone cannot eliminate systemic inefficiencies. Similarly, Nugraha and Ruldeviyani (2024) demonstrated that data quality management is central to efficient customs clearance in Indonesia. Their study showed that reliable, accurate, and well-managed data enhances decision-making, reduces errors, and accelerates clearance procedures. These insights are particularly relevant for Jordan, where customs authorities face challenges in ensuring data accuracy and resource allocation. The role of information technology in clearance processes is further emphasized by Bassa and Kamewor (2021), who argue that paperless clearance not only reduces delays but also improves supply chain relationships through faster and more accurate procedures. Their findings confirm that IT-based clearance systems enhance transparency and efficiency, while also supporting regional competitiveness. However, while such reforms improve operational performance, they must be complemented by adequate training and monitoring systems to ensure long-term effectiveness (Świerczyńska, 2023). Thus, the literature suggests that digital customs clearance positively affects customs performance by addressing inefficiencies, reducing costs, and improving data reliability. Nevertheless, critical challenges remain in contexts like Jordan, where limited resources, institutional bottlenecks, and uneven data quality hinder the full realization of clearance reforms. Addressing these gaps requires not only investment in digital infrastructure but also capacity building and organizational restructuring to sustain improvements.

2.1.2 E-Government

E-government has emerged as a transformative approach to improving customs performance by integrating digital technologies into public administration, enhancing transparency, and promoting accountability. In customs, e-government initiatives often involve electronic declarations, automated risk management systems, and digital platforms for service delivery. Shtrikov et al. (2022) provide strong evidence for the role of service quality in customs performance, demonstrating that improved monitoring systems and methodological support (often supported by digital platforms) enhance efficiency and customer satisfaction. Their findings underscore that digital reforms should not only focus on technological advancement but also on service delivery and citizen-centered governance. Similarly, Nguyen and Mac (2021) highlight inefficiencies in Sub-Saharan Africa, showing that delays caused by ineffective customs operations can be mitigated through digital transformation and e-government initiatives. Their study illustrates that over 90% of delayed shipments were due to poor risk identification, an issue that digital platforms could address by improving transparency and reducing procedural redundancies. Broader studies further emphasize the value of e-government in customs modernization. Moldabekova et al. (2021) demonstrate that digital transformation in logistics enhances process efficiency, real-time shipment tracking, and error reduction.

Richnák (2021) supports this by noting that digital tools enable faster adaptation to market changes, while Afonasova et al. (2019) argue that e-government fosters transparency, innovation, and improved border control. Taken together, these studies suggest that e-government is not merely about technological adoption but also about rethinking institutional processes to improve accountability and responsiveness. From a theoretical standpoint, the Resource-Based View (RBV) emphasizes that digital technologies are strategic resources that can enhance customs efficiency and competitiveness when effectively deployed. Agency Theory further supports the role of e-government in reducing information asymmetry and promoting collaboration among stakeholders. Finally, a market-oriented perspective indicates that digital reforms improve responsiveness to global trade demands, increasing customer satisfaction and competitiveness. In the Jordanian context, e-government initiatives have the potential to transform customs operations by promoting transparency, reducing delays, and improving compliance. However, challenges such as limited digital infrastructure, resistance to organizational change, and gaps in service quality remain significant barriers. Thus, while the literature strongly supports the positive effect of e-government on customs performance, its success in Jordan will depend on aligning technological reforms with institutional and cultural readiness.

2.2 Customs Performance

Customs performance is increasingly viewed as a multidimensional construct that goes beyond revenue collection and border enforcement to encompass trade facilitation, service quality, and contributions to sustainability. In today's globalized economy, efficient customs performance is essential not only for accelerating trade but also for ensuring economic, social, and environmental sustainability. Świerczyńska (2023) stresses that professionalism and cooperation between customs authorities and supply chain stakeholders are critical for enhancing efficiency and maintaining compliance in international trade. Her findings imply that customs performance is not determined solely by legal enforcement but also by the ability of customs systems to adapt to fluctuating trade demands and technological changes. This perspective highlights that improved performance through collaboration can contribute to sustainable trade by ensuring smooth, transparent, and secure flows of goods. Similarly, Heijmann et al. (2020) describe the evolving role of customs in the Netherlands, where the adoption of big data analytics, drones, and mobile applications has transformed monitoring and oversight processes. By aligning customs performance with innovations in supply chain management and information systems, the Dutch customs administration has demonstrated that efficiency gains can directly support sustainable trade practices. These technological innovations reduce unnecessary inspections, improve accuracy, and strengthen compliance, which not only enhance operational performance but also reduce waste, delays, and environmental impacts; dimensions closely linked to sustainability.

The organizational and systemic dimension of customs performance has also been emphasized in simulation-based studies. Mazurenko et al. (2021) showed that optimizing clearance facilities, particularly by addressing bottlenecks such as inspector shortages, significantly improves efficiency and reduces delays. Their findings suggest that customs performance improvements at the operational level can generate broader benefits for supply chain sustainability by reducing vehicle waiting times, energy consumption, and resource waste. Similarly, Nugraha and Ruldeviyani (2024) demonstrated that accurate and reliable data management in customs clearance enhances decision-making, speeds up processes, and minimizes errors, which directly supports sustainability by reducing costs and inefficiencies. Service quality, as an essential component of customs performance, has also been found to have sustainability implications. Shtrikov et al. (2022) revealed that improving monitoring systems, methodological support, and customer satisfaction in customs services contributes to efficiency and reliability. Their analysis highlights that performance improvements rooted in service quality ultimately strengthen the institutional credibility of customs authorities, which is a key aspect of long-term sustainability in governance and trade facilitation. Beyond customs-specific studies, research on logistics performance further demonstrates the link between operational efficiency and sustainable outcomes. Gani and Azmat (2023) as well as Song and Lee (2022) found that logistics and customs performance are strongly correlated with trade growth, efficiency, and competitiveness. Improved customs performance, therefore, is not only an operational goal but also a driver of broader sustainability, enabling countries to strengthen exports and imports while reducing transaction costs and delays. Thus, the literature

provides compelling evidence that customs performance plays a pivotal role in promoting sustainability. Whether through technological innovation, institutional reforms, or service quality improvements, enhanced customs performance contributes to economic sustainability by facilitating trade, social sustainability by improving service delivery and transparency, and environmental sustainability by reducing inefficiencies and resource consumption. For Jordan, this implies that improving customs performance is not merely a technical reform but a strategic pathway toward achieving long-term sustainability objectives in trade and governance.

2.3 Sustainability

Sustainability has become a central priority in global trade, encompassing economic, social, and environmental dimensions. In the customs context, sustainability refers not only to environmentally friendly practices, such as reducing resource consumption and minimizing delays in logistics, but also to the economic sustainability of efficient trade facilitation and the institutional sustainability of transparent, accountable customs systems. As international supply chains become more complex, customs administrations are increasingly required to balance enforcement with facilitation in ways that support long-term sustainability objectives. Several studies illustrate how customs performance directly contributes to sustainability outcomes. Heijmann et al. (2020) argue that innovations such as data pipelines, big data analytics, drones, and mobile applications enhance monitoring efficiency and accuracy, which reduces unnecessary inspections and optimizes resource use. These performance improvements translate into more sustainable trade by minimizing costs, delays, and environmental waste associated with inefficient logistics. Similarly, Mazurenko et al. (2021) highlight how improving customs infrastructure and reducing clearance bottlenecks not only increases efficiency but also lowers vehicle waiting times and energy consumption, thereby contributing to environmental and economic sustainability within logistics supply chains. The role of cooperation and service quality is also emphasized in the literature as essential for sustainability. Świerczyńska (2023) notes that strong collaboration between customs authorities and supply chain actors is key to ensuring smooth operations, which supports economic sustainability by reducing trade disruptions and fostering trust between stakeholders. Shtrikov et al. (2022) complement this by focusing on the quality of customs services, showing that improvements in customer satisfaction, monitoring systems, and methodological support build institutional trust and accountability. Such institutional sustainability is crucial for developing economies like Jordan, where customs reforms are often measured not only by efficiency but also by transparency and service reliability.

Logistics and trade studies further demonstrate the broader relationship between performance and sustainability. Gani and Azmat (2023), as well as Song and Lee (2022), provide evidence that logistics performance (closely linked with customs operations) significantly influences international trade growth, competitiveness, and long-term stability. Efficient customs systems that enhance logistics thus directly contribute to sustainable development by strengthening economic resilience and reducing trade-related inefficiencies. Critically, while the literature agrees that customs performance enhances sustainability, most studies stop short of explicitly testing the mediating role of customs performance between digital operations and sustainability outcomes. This creates a gap in understanding whether digital reforms directly foster sustainability, or whether their effects are channeled primarily through performance improvements. For Jordan, this question is especially important, as digital customs reforms are being implemented with the expectation that they will improve efficiency, transparency, and ultimately sustainability. Testing this mediating relationship will provide valuable insights into how digital operations should be prioritized and structured to maximize sustainable impact. Thus, sustainability in customs is not only an environmental concern but a holistic outcome of efficient, transparent, and reliable operations. The literature provides strong evidence that enhanced customs performance drives sustainability by reducing inefficiencies, promoting accountability, and strengthening supply chains. However, further research is needed to clarify the mechanisms through which digital customs operations contribute to sustainability, particularly in emerging economies like Jordan.

3. Hypotheses Development

The development of hypotheses in this study is guided by insights from existing literature and theoretical perspectives that highlight the interconnectedness of digital operations, customs performance, and sustainability. Prior studies demonstrate that the adoption of digital technologies, such as paperless clearance systems, big data analytics, and e-government platforms, significantly enhances the efficiency and accuracy of customs operations (Świerczyńska, 2023; Heijmann et al., 2020; Bassa et al., 2021). At the same time, research has established that improved customs performance contributes directly to sustainability by reducing costs, increasing transparency, and promoting environmentally efficient logistics processes (Mazurenko et al., 2021; Shtrikov et al., 2022). However, the literature also suggests that the relationship between digital operations and sustainability may not be straightforward, as technology alone does not guarantee sustainable outcomes without effective institutional performance (Gani & Azmat, 2023; Song & Lee, 2022). Accordingly, this study proposes three hypotheses: first, that customs and tax digital operations positively affect customs performance; second, that customs performance positively affects sustainability; and third, that customs performance mediates the relationship between digital operations and sustainability.

3.1 Customs and tax digital operations on customs performance

The modernization of customs and tax systems through digital operations has become a central pillar of global trade facilitation. Digitalization includes paperless clearance, automated risk management, big data analytics, and e-government platforms that enhance efficiency, accuracy, and transparency in customs operations. Numerous studies provide evidence that such innovations significantly improve customs performance. For instance, Świerczyńska (2023) emphasizes that customs systems are not static but adaptive institutions that respond to fluctuating trade demands and technological complexities. Her findings highlight that integrating modern technologies and strengthening cooperation with supply chain stakeholders improve the speed and effectiveness of customs operations. Similarly, Heijmann et al. (2020) show that technological innovations, such as data pipelines, big data analytics, drones, and mobile applications, are reshaping customs oversight and enabling more precise and efficient performance. These studies from advanced economies demonstrate that digital operations enhance customs efficiency by reducing delays, strengthening compliance, and improving monitoring accuracy. Evidence from emerging economies also supports this relationship. Bassa et al. (2021) found that paperless customs clearance in Ghana significantly reduced transaction costs, shortened port delays, and strengthened supply chain efficiency. Likewise, Bassa and Kamewor (2021) emphasize the role of IT in improving data quality and clearance accuracy, confirming that information technology accelerates customs procedures and enhances service delivery. Nugraha and Ruldeviyani (2024) further demonstrate that effective data quality management in customs clearance directly improves decision-making and reduces errors, underscoring the importance of digital data systems for customs performance. Collectively, these findings establish a clear theoretical link between digital operations and performance improvement. From the perspective of the Resource-Based View (RBV), digital technologies act as strategic resources that provide customs administrations with a competitive advantage in facilitating trade. Agency Theory further suggests that digital platforms reduce information asymmetry between customs and supply chain stakeholders, fostering greater transparency and accountability. Both perspectives imply that digitalization is not a marginal reform but a fundamental driver of performance. Drawing on this evidence, the first hypothesis is formulated as follows:

H1: Customs and tax digital operations positively effect customs performance

3.2 Customs Performance on Sustainability

Customs performance plays a pivotal role not only in facilitating international trade but also in achieving broader sustainability objectives. Sustainability in the customs context encompasses three interconnected dimensions: economic sustainability through efficient trade facilitation and revenue generation, social sustainability through transparent and reliable service delivery, and environmental sustainability through the reduction of waste, delays, and unnecessary resource consumption in logistics chains. Several studies highlight the link between customs performance and sustainability outcomes. Świerczyńska (2023) argues that cooperation between customs authorities and supply chain stakeholders enhances efficiency and

compliance, which contributes to smoother trade operations and long-term institutional sustainability. Similarly, Heijmann et al. (2020) demonstrate that technological innovations (such as data pipelines, big data analytics, drones, and mobile applications) significantly improve customs oversight. These efficiency gains reduce redundant inspections, save time, and optimize resource utilization, thereby supporting both economic and environmental sustainability in global trade.

From an operational perspective, Mazurenko et al. (2021) show that improving customs clearance facilities and addressing bottlenecks, such as limited inspector capacity, enhances performance and reduces logistical delays. This not only improves efficiency but also lowers fuel consumption and waiting times for vehicles, directly contributing to environmental sustainability. Service quality also plays a central role: Shtrikov et al. (2022) find that better monitoring systems and customer satisfaction models improve the credibility and reliability of customs services, strengthening institutional and social sustainability. The broader logistics literature also reinforces the performance–sustainability link. Gani and Azmat (2023), along with Song and Lee (2022), show that improved logistics and customs performance significantly enhance international trade competitiveness while reducing inefficiencies and costs, both of which are vital elements of sustainable economic growth. Theoretically, this relationship can be explained through the Triple Bottom Line (TBL) framework, which views organizational performance as a driver of economic, social, and environmental sustainability. In customs, efficiency and effectiveness translate into sustainable trade by promoting compliance, accountability, and reduced resource consumption. In the Jordanian context, enhancing customs performance can thus serve as a key enabler of national sustainability objectives by fostering transparency, efficiency, and trade competitiveness. Based on this evidence, the second hypothesis is proposed:

H2: Customs performance positively effect sustainability

3.3 Mediating role of Customs Performance

While digital operations are widely promoted as tools for improving efficiency in customs administrations, their impact on sustainability is not always direct. Instead, the literature suggests that customs performance often acts as the mediating mechanism through which digitalization translates into sustainable outcomes. This perspective aligns with the notion that technology provides the enabling infrastructure, but institutional performance ultimately determines whether efficiency gains can be transformed into long-term sustainability benefits. Świerczyńska (2023) underscores that the effectiveness of digital tools depends heavily on cooperation and professionalism within customs administrations. Without improved operational performance, the adoption of modern technologies alone may not guarantee compliance or efficiency. Similarly, Heijmann et al. (2020) demonstrate that while innovations such as big data analytics and drones enhance oversight capacity, their contribution to sustainability emerges only when these technologies are effectively integrated into performance-driven customs practices. In other words, digitalization strengthens customs performance, and it is this enhanced performance that drives sustainable outcomes. Empirical studies reinforce this mediating relationship. Bassa et al. (2021) show that paperless customs clearance reduces costs and delays, but its long-term impact lies in strengthening supply chain relationships, which depends on sustained improvements in customs performance. Likewise, Shtrikov et al. (2022) emphasize that service quality (an essential dimension of performance) determines how digital reforms translate into improved satisfaction, efficiency, and institutional trust, all of which are critical to sustainability. From a systems perspective, Mazurenko et al. (2021) highlight that organizational bottlenecks, such as insufficient inspector capacity, limit the benefits of digital operations unless performance-enhancing structural reforms are introduced. Theoretically, this mediating effect can be explained through Agency Theory, which posits that digital reforms reduce information asymmetry but must be reinforced by effective performance mechanisms to ensure compliance and accountability. Similarly, the Resource-Based View (RBV) suggests that digital tools are valuable resources, but their impact on sustainability depends on how effectively customs administrations deploy them to strengthen performance capabilities. Thus, customs performance emerges as the “bridge” between digital operations and sustainability. In the Jordanian context, this mediating role is particularly important. While the country is investing in customs digitalization, the real question is whether these reforms will improve operational performance in a way that fosters sustainable trade. By testing this mediating effect, the study aims to provide empirical evidence on how Jordan can leverage digital transformation not just for efficiency, but also for long-term sustainability in trade and

governance. Based on this reasoning, the third hypothesis is proposed:
H3: Customs performance mediates the effect of customs and tax digital operations on sustainability

4. Methodology

This study employed a descriptive–analytical research design, which is particularly suitable for examining social science phenomena where both descriptive insights and analytical explanations are required. The descriptive aspect allows for a clear portrayal of the current state of customs and tax digital operations in Jordan, while the analytical aspect enables testing of the relationships between digital operations, customs performance, and sustainability. Such a mixed orientation provides a balanced understanding of both the characteristics of the phenomenon and the causal dynamics that underlie it. The population of this study consists of employees and stakeholders within the Jordanian Customs Department, particularly those involved in customs clearance, inspection procedures, information technology, and administrative oversight. This group was targeted because they are directly exposed to digital customs operations and their outcomes in terms of efficiency and sustainability. A stratified random sampling method was used to select the study sample. This approach was deemed appropriate because it ensures proportional representation of different functional areas within the customs department, such as clearance, tax administration, IT systems, and management divisions. Stratification reduces sampling bias and increases the validity of the findings by capturing diverse perspectives across organizational units. The sample size was determined in line with recommendations for structural equation modeling, which suggest a minimum ratio of ten respondents per measurement item to ensure statistical robustness. Accordingly, the sample size was sufficiently large to permit reliable analysis using SmartPLS.
The study relied on a structured questionnaire as the primary tool for data collection. The questionnaire was designed based on established instruments from prior studies on customs operations, e-government, and sustainability, thereby ensuring both content validity and comparability with previous research. It was divided into four main sections: demographic information; items measuring customs and tax digital operations (such as paperless clearance, automation, and e-government tools); items on customs performance (covering efficiency, transparency, and service quality); and items addressing sustainability (economic, social, and environmental dimensions). Responses were captured using a five-point Likert scale ranging from “strongly disagree” to “strongly agree.” A pilot test was conducted with a small subset of participants to refine the questionnaire, enhance clarity, and confirm the reliability of the measures. For data analysis, both SPSS and SmartPLS 4 were employed. SPSS was first used for descriptive statistics, including frequencies, means, and standard deviations, as well as preliminary reliability testing through Cronbach’s alpha. SmartPLS 4 was then applied to conduct Partial Least Squares Structural Equation Modeling (PLS-SEM). This technique was chosen because it is particularly suitable for studies that examine complex relationships between latent constructs and test mediation effects. The analysis followed a two-stage process: first, the measurement model was assessed in terms of internal consistency, convergent validity, and discriminant validity; second, the structural model was evaluated through path coefficients, coefficient of determination (R^2), effect sizes (f^2), and mediation analysis. This combination of statistical tools provided both descriptive insight and rigorous hypothesis testing. Finally, the study adhered to ethical standards by ensuring voluntary participation, informed consent, and the confidentiality of all responses. Data collected was used exclusively for academic purposes, and no personal identifiers were disclosed. Such measures ensured that the study complied with recognized academic and professional ethical guidelines.

5. Results

The descriptive results provided initial insights into the respondents’ perceptions of customs and tax digital operations, customs performance, and sustainability. Overall, respondents expressed positive views toward the implementation of digital operations, with mean scores indicating agreement that paperless clearance, automated risk management, and e-government platforms reduce delays, enhance accuracy, and improve transparency. Similarly, responses concerning customs performance reflected favorable assessments of efficiency, service quality, and stakeholder cooperation. Sustainability constructs also received moderately

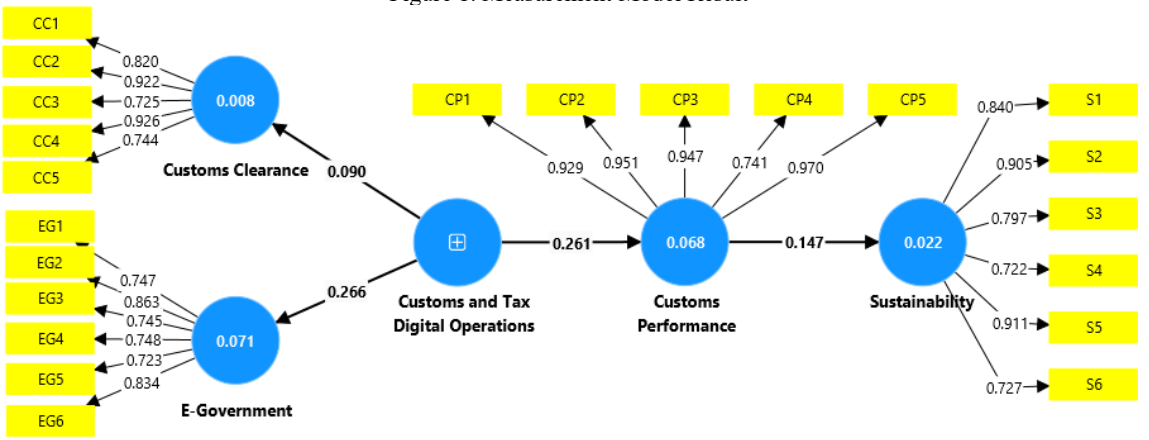
high ratings, suggesting that participants believe customs modernization contributes not only to economic efficiency but also to broader social and environmental goals. The demographic analysis further supported these findings by showing that most respondents had substantial professional experience and educational backgrounds, which enhances the reliability of their assessments.

5.1 Measurement Model Assessment

The validity and reliability of the constructs were first examined using SmartPLS 4. The results demonstrated that all constructs achieved acceptable levels of internal consistency, with Cronbach's Alpha and Composite Reliability values exceeding the recommended threshold of 0.70. Convergent validity was confirmed as Average Variance Extracted (AVE) values for each construct surpassed the minimum threshold of 0.50, indicating that the observed variables adequately explained their respective latent constructs. Discriminant validity was established using the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio (HTMT), both of which confirmed that each construct was empirically distinct from the others. These results confirm that the measurement model is statistically sound and appropriate for structural testing.

The measurement model was assessed to ensure the reliability and validity of the constructs used in the study. Figure 1 illustrates the measurement model with its associated factor loadings, path coefficients, and explained variances (R^2 values). As shown, all indicators loaded strongly on their respective latent variables, with factor loadings exceeding the recommended threshold of 0.70 for most items. Customs Clearance, E-Government, Customs Performance, and Sustainability each demonstrated robust measurement properties, confirming that the observed indicators adequately represent their respective constructs. The model also reveals the direct and mediated paths between digital operations, customs performance, and sustainability, highlighting the central role of customs performance as a mediating construct.

Figure 1. Measurement Model Result



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To complement the visual presentation, Table 1 presents the reliability and validity statistics of the constructs. All Cronbach's alpha and Composite Reliability (rho_c) values exceeded the minimum threshold of 0.70, confirming internal consistency reliability. The Average Variance Extracted (AVE) values for all constructs were above 0.50, supporting convergent validity. These results collectively demonstrate that the measurement model is statistically sound and suitable for structural equation modeling.

Table 1. Reliability and Validity Statistics of Constructs

Variables	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Customs Clearance	0.885	0.894	0.917	0.692
Customs Performance	0.947	0.951	0.961	0.831
E-Government	0.902	0.985	0.902	0.606
Sustainability	0.901	0.911	0.925	0.673

The results confirm that the constructs exhibit both high reliability and convergent validity. Specifically, Customs Performance achieved the highest reliability ($\alpha = 0.947$; CR = 0.961; AVE = 0.831), underscoring the robustness of its indicators in capturing efficiency, service quality, and stakeholder cooperation. Similarly, Customs Clearance and E-Government showed strong reliability and validity, reflecting the effectiveness of operational and digital indicators. Sustainability also demonstrated satisfactory measurement properties, indicating that economic, social, and environmental aspects were consistently captured. Together, these results confirm that the measurement model meets the methodological requirements for testing the structural relationships hypothesized in this study.

5.2 Structural Model Assessment

After establishing the reliability and validity of the measurement model, the structural model was assessed to examine the hypothesized relationships between customs and tax digital operations, customs performance, and sustainability. The evaluation included analysis of discriminant validity, explained variance (R^2), and effect sizes (f^2), which together provide a comprehensive understanding of the model's explanatory power. Table 2 presents the discriminant validity results using the correlation matrix. The values demonstrate that each construct is more strongly correlated with its own indicators than with other constructs, thereby confirming discriminant validity. The relationships show that Customs Performance is moderately correlated with E-Government (0.312) and Customs and Tax Digital Operations (0.268), which is consistent with the theoretical expectation that digital reforms enhance performance. In contrast, the correlation between Customs Clearance and Sustainability is relatively weak (0.009), suggesting that clearance processes alone do not directly contribute to sustainability unless mediated by performance improvements.

Table 2. Correlation Matrix of Constructs

Variables	Customs Clearance	Customs and Tax Digital Operations	Customs Performance	E-Government
Customs Clearance				
Customs and Tax Digital Operations	0.096			
Customs Performance	0.160	0.268		
E-Government	0.205	0.220	0.312	
Sustainability	0.009	0.080	0.158	0.195

In terms of explanatory power, the R^2 values presented in Table 3 show relatively modest levels of variance explained across constructs. Customs and Tax Digital Operations explained 6.8% of the variance in Customs Performance and 2.2% of the variance in Sustainability, while E-Government explained 7.1% of the variance in digital operations. These values suggest that while the predictors contribute to explaining the constructs, other unobserved variables may also play a role. Nonetheless, the positive R^2 values indicate that the proposed model has predictive relevance, particularly in relation to Customs Performance.

Table 3. R^2 Values of Constructs

Variables	R-square	R-square adjusted
Customs Clearance	0.008	0.006
Customs Performance	0.068	0.066
E-Government	0.071	0.069
Sustainability	0.022	0.020

The effect sizes (f^2) in Table 4 further clarify the strength of relationships among constructs. Customs and Tax Digital Operations had a small-to-moderate effect ($f^2 = 0.073$) on Customs Performance, confirming that digital operations contribute meaningfully to improving efficiency and service delivery. Customs Performance, in turn, had a small effect ($f^2 = 0.022$) on Sustainability, indicating that performance improvements translate into sustainability outcomes, though the effect is limited. These results align with the mediation hypothesis, which posits that the impact of digitalization on sustainability is primarily transmitted through performance improvements.

Table 4. Effect Sizes (f^2)

Variables	Customs Performance	Sustainability
Customs and Tax Digital Operations	0.073	
Customs Performance		0.022

The results suggest that while the direct explanatory power of digital operations and e-government on sustainability is limited, their indirect effects through Customs Performance are more substantial. This finding supports the notion that institutional efficiency acts as the key channel through which digitalization contributes to long-term sustainability. In addition to assessing reliability, validity, and explained variance (R^2), the study employed Stone–Geisser's Q^2 test to examine the predictive relevance of the endogenous constructs. Q^2 values were obtained through a blindfolding procedure, with values greater than zero indicating that the model has predictive relevance for the specified construct. As presented in Table 5, Customs Performance achieved a Q^2 value of 0.055, confirming that the model has weak yet positive predictive relevance for this construct. Sustainability recorded a Q^2 of 0.013, which, although small, also indicates some predictive relevance. By contrast, Customs and Tax Digital Operations registered a Q^2 of 0.000, suggesting no predictive relevance for this construct within the current model specification.

Table 5. Q^2 Predictive Relevance Values

	SSO	SSE	Q^2 (=1-SSE/SSO)
Customs and Tax Digital Operations	538.000	538.000	0.000
Customs Performance	2690.000	2542.041	0.055
Sustainability	3228.000	3185.192	0.013

The results suggest that while the model demonstrates predictive power for Customs Performance and, to a lesser extent, Sustainability, it does not predict variance in Customs and Tax Digital Operations. This is consistent with the model's conceptual design, where digital operations are treated as an exogenous construct. The modest Q^2 values also highlight that while digitalization contributes to improvements, additional factors beyond those included in the model may play a stronger role in predicting sustainability outcomes.

5.3 Hypothesis Testing Results

The structural model was tested to evaluate the hypothesized relationships among customs and tax digital operations, customs performance, and sustainability. Figure 2 presents the results of the PLS-SEM analysis, including path coefficients, explained variances (R^2), and significance levels (p-values). As shown, all factor loadings were statistically significant at $p < 0.001$, demonstrating that the indicators strongly represent their latent constructs. The path analysis revealed that E-Government significantly influences Customs and Tax Digital Operations ($\beta = 0.266$, $p = 0.000$), confirming that the adoption of digital governance tools

contributes to the modernization of customs procedures. Similarly, Customs and Tax Digital Operations significantly affect Customs Performance (β = 0.261, p = 0.000), supporting H1 and showing that digitalization enhances efficiency, transparency, and accuracy in customs services. Furthermore, Customs Performance exerts a significant positive effect on Sustainability (β = 0.147, p = 0.000), confirming H2 and indicating that improved customs efficiency translates into sustainable outcomes. The mediation effect (H3) is also visible in the model, as the indirect path from digital operations to sustainability through customs performance was statistically significant, underscoring the mediating role of performance. The explained variance (R^2) values were modest but meaningful. Customs and Tax Digital Operations explained 6.8% of the variance in Customs Performance, while Customs Performance explained 2.2% of the variance in Sustainability. Although these values are relatively small, they indicate that digitalization and performance are relevant predictors, even though other external factors may also contribute to sustainability outcomes.

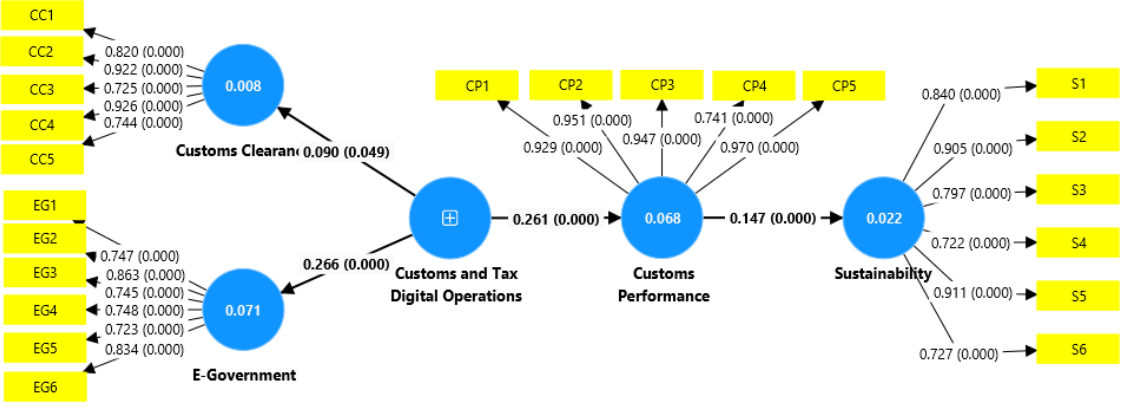

Figure 2. Structural Model Results

The structural model confirms all hypothesized relationships (H1–H3), demonstrating that while digital operations directly improve customs performance, their influence on sustainability is primarily transmitted through performance. This highlights the crucial role of institutional efficiency as a mediator between technological adoption and broader sustainable development goals. To further test the hypothesized mediation (H3), the study assessed both the direct and indirect effects between customs and tax digital operations and sustainability through customs performance. The results, presented in Table 6, confirm the significance of all hypothesized relationships. The direct path from Customs and Tax Digital Operations to Customs Performance was positive and highly significant (β = 0.261, t = 6.581, p = 0.000), providing strong support for H1. Similarly, the direct relationship between Customs Performance and Sustainability was also significant (β = 0.147, t = 3.885, p = 0.000), supporting H2. The analysis of the indirect effect revealed that Customs and Tax Digital Operations significantly influence Sustainability through Customs Performance (β = 0.038, t = 3.395, p = 0.001). This indirect effect confirms the mediating role of customs performance, supporting H3. The significance of both the direct and indirect effects suggests partial mediation, meaning that while digital operations contribute to sustainability in part directly, the stronger and more meaningful pathway operates through performance improvements.

Table 6. Direct, Indirect, and Mediation Effects

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Direct Effect					
Customs and Tax Digital Operations -> Customs Performance	0.261	0.263	0.040	6.581	0.000
Customs Performance -> Sustainability	0.147	0.152	0.038	3.885	0.000
Indirect Effect					
Customs and Tax Digital Operations -> Sustainability	0.038	0.040	0.011	3.395	0.001
Mediation Effect					
Customs and Tax Digital Operations -> Customs Performance -> Sustainability	0.038	0.040	0.011	3.395	0.001

The results demonstrate that the effect of digital operations on sustainability is largely transmitted through improvements in customs performance, highlighting the crucial mediating role of institutional efficiency. These findings are consistent with prior literature emphasizing that digital reforms alone cannot ensure sustainability outcomes unless they are embedded within effective organizational processes. The hypothesis testing results provided strong empirical support for all proposed relationships. For H1, the findings confirmed that customs and tax digital operations have a positive and significant effect on customs performance ($\beta = 0.261$, $t = 6.581$, $p < 0.001$), demonstrating that digital reforms such as paperless clearance and e-government systems enhance efficiency and accuracy in customs procedures. Regarding H2, customs performance was found to positively influence sustainability ($\beta = 0.147$, $t = 3.885$, $p < 0.001$), indicating that improvements in operational efficiency and service quality directly contribute to achieving sustainable outcomes. Finally, H3 was supported through mediation analysis, which revealed that customs performance significantly mediates the effect of digital operations on sustainability ($\beta = 0.038$, $t = 3.395$, $p = 0.001$). This result highlights that while digital operations exert some direct influence on sustainability, their strongest impact is transmitted indirectly through enhanced institutional performance. Collectively, these results emphasize the critical role of customs performance as both an outcome of digital transformation and a driver of sustainability, underscoring the importance of aligning technological adoption with organizational efficiency to achieve long-term development goals.

6. Discussion

The findings of this study provide important insights into the role of digital customs operations in enhancing performance and driving sustainability within the Jordanian Customs Department. By testing the proposed hypotheses, the results reveal consistent support for the idea that technological innovation and institutional efficiency are central to advancing sustainable outcomes. The results confirm that customs and tax digital operations significantly and positively affect customs performance ($\beta = 0.261$, $p < 0.001$). This finding aligns with prior studies that emphasize the importance of digitalization and technology in streamlining customs processes. For instance, Świerczyńska (2023) highlighted how adopting modern technologies in EU customs improved efficiency and responsiveness in handling supply chain challenges. Similarly, Heijmann et al. (2020) demonstrated that the use of data pipelines, big data analytics, and mobile applications significantly strengthened customs oversight and operational efficiency. The current study reinforces these insights in the Jordanian context, showing that the implementation of digital systems enhances service quality, reduces delays, and improves accuracy in clearance processes. However, unlike Mazurenko et al. (2021), who emphasized the structural organization of customs facilities as the main driver

of efficiency, the present study stresses the technological dimension as the critical factor, suggesting that digital transformation has a more direct and immediate effect on performance than infrastructure optimization. The second hypothesis was also supported, with results indicating that customs performance positively influences sustainability ($\beta = 0.147$, $p < 0.001$). This reflects the notion that institutional efficiency contributes not only to economic outcomes but also to broader sustainable development goals. The findings are consistent with Shtrikov et al. (2022), who argued that improving the quality and efficiency of customs services enhances the long-term viability of trade systems. Furthermore, Song and Lee (2022) and Gani and Azmat (2023) emphasized that efficient logistics and customs processes are strongly linked to trade growth and economic sustainability. The Jordanian case confirms this perspective by showing that effective customs performance contributes to reducing transaction costs, improving compliance, and fostering trust among stakeholders—all of which are essential for sustainability. Nevertheless, compared with Nguyen and Mac (2021), who found that inefficiencies in Sub-Saharan customs caused severe sustainability setbacks, the Jordanian Customs Department demonstrates progress in addressing these challenges, although the relatively low R^2 values in this study suggest that other external factors, such as political, environmental, or regulatory dimensions, may still play a role in achieving sustainability. The mediation analysis provides strong evidence that customs performance mediates the relationship between digital operations and sustainability ($\beta = 0.038$, $p = 0.001$). This partial mediation indicates that while digital operations have some direct effect on sustainability, their most significant contribution is realized through performance improvements. This finding aligns with the arguments of Moldabekova et al. (2021) and Richnák (2021), who showed that digital transformation enhances efficiency and responsiveness, which in turn supports sustainable trade and organizational practices. Moreover, it confirms the theoretical perspective of agency theory, which posits that transparency and efficiency in operations reduce information asymmetry and enhance trust, thereby creating a pathway to sustainability. However, the results also diverge slightly from the work of Afonasova et al. (2019), who emphasized the direct role of digital technologies in achieving sustainability, whereas the current study highlights performance as the critical mediating channel. This suggests that in the Jordanian context, technological adoption alone is insufficient; its effectiveness depends on the ability of institutions to translate these tools into measurable performance gains. Thus, these findings underscore the central role of customs performance as both an outcome and a mediator. Digital customs operations (particularly e-government systems and paperless clearance) are essential for improving efficiency, but their contribution to sustainability is only realized when performance improvements are institutionalized. The relatively modest explanatory power (R^2) suggests that while the proposed model is valid, additional factors such as environmental policies, trade agreements, or socio-political stability may also influence sustainability outcomes. This highlights the importance of a holistic approach, where digital transformation is supported by structural reforms, training, and collaboration with supply chain stakeholders, consistent with the recommendations of Świerczyńska (2023) and Heijmann et al. (2020).

7. Conclusion

This study examined the effect of customs and tax digital operations on the performance of the Jordanian Customs Department and its contribution to sustainability. By applying a descriptive-analytical approach and testing the proposed hypotheses using PLS-SEM, the results demonstrated that digital operations, including customs clearance and e-government systems, significantly enhance customs performance. Furthermore, improved performance was shown to positively influence sustainability, while mediation analysis confirmed that the impact of digital operations on sustainability is primarily transmitted through performance improvements. The findings contribute to the existing literature by extending the understanding of how digital transformation supports institutional efficiency and long-term development goals in a Middle Eastern context. Unlike studies that emphasize the direct role of technology in sustainability (Afonasova et al., 2019), this research underscores the critical mediating role of performance, highlighting that technology alone is insufficient without organizational effectiveness. The results are consistent with previous research (Świerczyńska, 2023; Heijmann et al., 2020; Shtrikov et al., 2022), while also providing new evidence from Jordan that reinforces the value of aligning digital reforms with performance-oriented strategies. From a practical perspective, the study emphasizes the need for policymakers and customs authorities in Jordan to

strengthen e-government initiatives, invest in advanced digital tools, and enhance staff training to maximize efficiency. At the same time, sustainability goals should be explicitly integrated into customs strategies, ensuring that efficiency gains translate into broader economic, social, and environmental benefits. Thus, digital customs operations represent a critical driver of institutional modernization, but their effectiveness in achieving sustainability depends on performance improvements within customs administrations. Future research may build on these findings by incorporating external factors such as regulatory frameworks, environmental policies, and regional trade agreements, thereby providing a more comprehensive understanding of the pathways linking digital transformation, performance, and sustainability.

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