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Customs modernisation, trade facilitation and economic competitiveness in Morocco: Analysis of the relationship between customs reforms, trade performance and attractiveness

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ABSTRACT

This study examines the relationships between customs modernisation, procedural simplification, trade facilitation, digitalisation and several dimensions of economic performance in Morocco. It is set against the backdrop of the reforms to the BADR and PortNet systems and draws on transaction cost and institutional theories to explain how administrative and digital changes can support foreign trade. The quantitative analysis is based on a sample of 101 respondents and utilises structural equation modelling in AMOS. The reported KMO indices are 0.906 for modernisation, 0.905 for digitalisation and 0.935 for overall performance. The estimates indicate positive and significant associations between customs modernisation and trade performance (0.174; $p = 0.009$), procedural simplification and trade performance (0.315; $p < 0.001$), and trade facilitation and trade performance (0.357; $p < 0.001$).

Digitalisation is positively associated with economic competitiveness (0.576; $p < 0.001$). The single window is associated with international image (0.322), as are advanced technologies (0.552; $p < 0.001$). These results support the role of customs reforms in trade performance and certain dimensions of competitiveness. However, the available information does not allow for a detailed description of the sample characteristics or all the model's goodness-of-fit indices.

Keywords: customs modernisation; trade facilitation; digitalisation; BADR; PortNet; economic competitiveness; Morocco.

1. INTRODUCTION

The transformation of customs administrations is a key challenge for economies integrated into international value chains. Formalities, customs clearance times and regulatory predictability influence transaction costs and businesses' ability to import, export and meet their logistical commitments. Customs authorities are therefore called upon to balance their roles of control and revenue protection with objectives of efficiency, transparency and competitiveness (Attaoui & Elmeziane, 2023; Chekrouni et al., 2025).

In Morocco, the digitisation of procedures, the BADR system and the PortNet platform illustrate the shift towards data exchange and enhanced coordination between foreign trade stakeholders (Aboutaoufik & Salam, 2021; Attaoui & Elmeziane, 2023). The research question is as follows: to what extent are the modernisation of customs procedures and the digital facilitation of trade linked to Morocco's trade performance, economic competitiveness and international image?

The aim of this article is to empirically analyse the reported relationships between various drivers of customs reform and economic outcomes. The contribution lies in linking the institutional, procedural and technological dimensions of the customs system with performance indicators. The conclusions are limited to the relationships estimated and the available statistical data.

2. THEORETICAL FRAMEWORK AND RESEARCH MODEL

2.1 Transaction costs and institutional quality

Transaction cost theory provides a framework for interpreting the expected effects of administrative simplification. Reducing red tape, uncertainty and delays can lower the costs borne by operators and improve the predictability of trade. Institutional theory complements this analysis by emphasising the role of regulations, administrative coordination and the quality of public services in economic performance. From this perspective, customs modernisation depends both on technical tools and on the consistency of their implementation (Aboutaoufik & Salam, 2021; Boukyoud & El Moustakim, 2025).

2.2. Customs reforms and economic outcomes

The simplification and harmonisation of procedures aim to reduce redundant steps and make formalities more predictable. Trade facilitation refers in particular to cooperation between administrations, information sharing and proportionate management of controls. Digitalisation, for its part, can support the automation of processing, the traceability of operations and access to information. BADR and PortNet are examined as mechanisms associated with these transformations in the Moroccan context (Aboutaoufik & Salam, 2021; Attaoui & Elmeziane, 2023; Chekrouni et al., 2025).

The source conceptual model groups the determinants into several clusters: customs modernisation; procedural simplification and harmonisation; digitalisation; institutional coordination and a single window; smart control and risk management; customs-related economic regimes; strategic governance and economic attractiveness. The outcomes examined cover trade performance, competitiveness and international image. The quantitative estimates presented below are limited to those relationships for which coefficients have been reported. The challenges of trade security and risk management are also documented in the Moroccan customs context (Dafir & Imarhane, 2024).

2.3. Variables and operationalisation

The model distinguishes between seven explanatory variables and one overall dependent variable. The dimensions and indicators below reflect the constructs of the conceptual model provided.

Variable	Definition and selected dimensions
Modernisation of customs regimes	Regulatory reforms, administrative modernisation, professionalisation of services and organisational efficiency.
Simplification and harmonisation of customs procedures	Simplification of formalities, harmonisation of standards, regulatory clarity and standardisation of practices.
Customs digitalisation and information systems	Customs information systems, digital platforms, BADR, PortNet and data security.
Institutional coordination and a one-stop shop	Single window, public–private coordination and information sharing.

Smart control and risk management	Advanced technologies (AI, scanners), risk management and targeted, effective controls.
Customs-related economic schemes and business competitiveness	Suspension arrangements, free zones or warehouses, and export incentives.
Strategic governance and economic attractiveness	National attractiveness, sustainable development, strategic governance, institutional stability, quality of infrastructure, innovation and foreign investment.
Dependent variable: overall performance of the customs system and economic competitiveness	Trade performance, trade flow, speed of customs clearance, administrative efficiency, transparency and traceability, , business competitiveness, economic attractiveness and sustainable development.

The detailed indicators of the model comprise the observed variables e1 to e29 for the explanatory constructs and the indicators e31 to e38 for overall performance, as shown in the initial conceptual framework.

2.4. Research hypotheses

The following twelve hypotheses are taken from the wording of the document provided. They express the expected relationships between customs reforms and commercial, administrative and economic outcomes.

Code	Hypothesis
H1	The modernisation of customs systems significantly improves the performance of international trade.
H2	The simplification of customs procedures promotes the smooth flow of cross-border trade.
H3	The harmonisation of international customs standards enhances the legal certainty of commercial transactions.
H4	Applying the principles of trade facilitation improves the efficiency of customs administrations.
H5	The digitisation of customs information systems reduces customs clearance times.
H6	The use of digital customs platforms improves the transparency and traceability of operations.
H7	The introduction of the single window system strengthens coordination between public and private sector stakeholders in foreign trade.
H8	The integration of advanced technologies improves customs risk management and the effectiveness of controls.
H9	Improvements to customs control mechanisms strengthen the fight against fraud and illicit activities.
H10	Customs-related economic schemes boost the competitiveness of exporting businesses.
H11	The digitalisation of Moroccan customs through BADR and PortNet improves the efficiency of import and export operations.
H12	A smart, harmonised and digitised customs system is a strategic factor in economic attractiveness and sustainable development.

The empirical results reported in this article relate to the available coefficients for trade performance, economic competitiveness and international image. Relationships not accompanied by full estimates are not presented as confirmed or refuted.

Figure 1 presents the general conceptual model of the research. It organises the explanatory factors around the modernisation of customs regimes, the simplification of procedures, digitalisation, institutional coordination, smart control, economic customs regimes and strategic governance. These dimensions are linked to the expected outcomes in terms of trade performance, competitiveness and international image. This framework is in line with Moroccan research linking digital transformation, service quality and the performance of the customs administration (Attaoui, 2023a; Hamdaoui & Aissaoui, 2023).

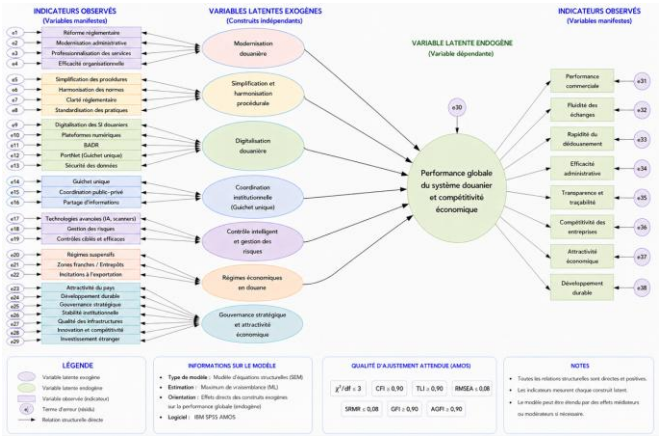


Figure 1: Conceptual research model

The diagram reflects an analytical framework in which administrative, organisational and technological levers are regarded as complementary. Simplification and facilitation aim to reduce procedural friction, whilst digitalisation and the single window support the exchange of information and coordination amongst stakeholders. The ADII's strategic directions for 2024–2028 and the launch of the Moroccan foreign trade procedures portal demonstrate this link between process reform and digital integration (ADII, 2024a; Ministry of Industry and Trade et al., 2026).

The figure thus sets out the theoretical relationships to be examined, but it does not in itself constitute evidence of a causal effect. The empirical results available in this study cover only some of the relationships in the model and do not allow conclusions to be drawn regarding all the hypotheses. Caution is also warranted because trade and port performance depends on institutional, logistical and infrastructural factors that go beyond the customs system alone (National Ports Agency, 2024; Houmaida, 2026).

Figure 2 sets out the initial version of the model and illustrates the proposed relationship between the explanatory constructs and the performance dimensions. It serves as a starting point for the formulation of the twelve hypotheses, H1 to H12, which relate to modernisation, procedures, facilitation, digital tools, the one-stop shop, controls and economic attractiveness. Research carried out in Morocco on the dematerialisation and digitisation of customs procedures confirms the relevance of these themes, particularly in relation to governance and the quality of public services (Hamdaoui & Aissaoui, 2023; Charki, 2026).

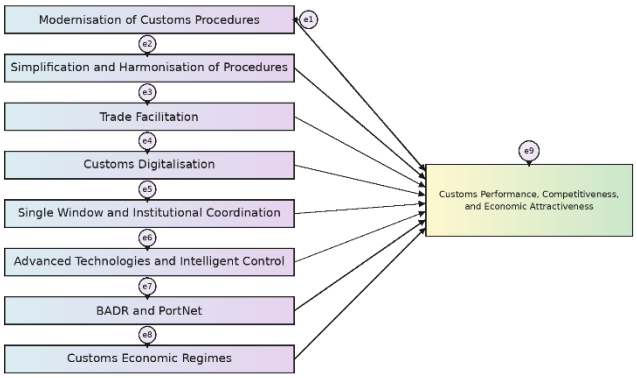


Figure 2: Initial conceptual model of research

An examination of the initial model shows that certain variables are conceptually similar but refer to distinct mechanisms. Digitalisation describes the use of information systems and platforms, whilst the single window concerns coordination between stakeholders; similarly, risk management relates to the targeting and effectiveness of controls. Recent literature on Moroccan customs specifically highlights the importance of combining digital capabilities with risk analysis and the maintenance of smooth trade flows (Attaoui, 2026; ADII, 2024b).

This representation should be understood as a theoretical framework rather than a statistical result. The arrows indicate the effects expected under the hypotheses; their confirmation requires documented estimates and levels of significance. In the data available for this article, only certain links to trade performance, competitiveness and international image have usable coefficients. Recent reports on foreign trade provide a useful national context, but do not replace the tests of the estimated model (Office des Changes, 2025).

Figure 3 presents the final model selected for the analysis, summarising the constructs and relationships retained in the study. It compares the levers of customs reform with the outcome dimensions, whilst distinguishing between the relationships that have actually been estimated and those that remain theoretical in the information provided. This distinction is consistent with research on the role of digital technology in the performance of the ADII and on the organisational effects of digitisation in Morocco (Attaoui, 2023a; Hamdaoui & Aissaoui, 2023).

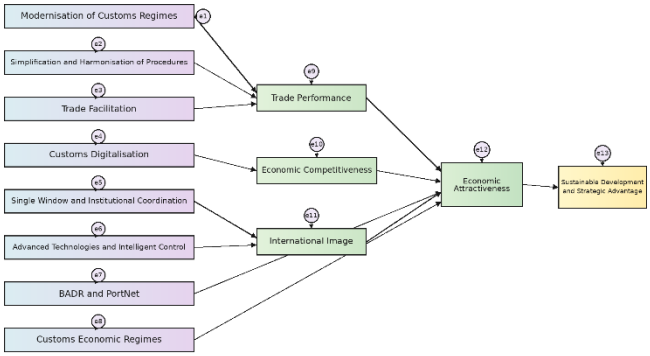


Figure 3: Final conceptual model of the study

The reported results support several relationships in the final model: modernisation, simplification and facilitation are associated with commercial performance; digitalisation is associated with competitiveness; and advanced technologies are associated with international reputation. The coefficient for the one-stop shop is also positive, but as its p-value is not available, its significance cannot be confirmed. These results can be linked to the operational guidelines of the ADII and the centralisation of procedures via PortNet, without equating this descriptive convergence with an independent validation of the coefficients (ADII, 2024a; PortNet, 2026).

The final diagram therefore summarises the observed results whilst maintaining the distinction between statistical association and causality. It does not allow us to infer that each reform automatically leads to an improvement in performance, nor to generalise beyond the respondents studied without further information on sampling and model fit. Institutional data and recent Moroccan studies support the relevance of the interpretative framework; however, full confirmation of the model would require measurement diagnostics and goodness-of-fit indices, which are not included in the submitted dossier (Office des Changes, 2025; Houmaida, 2026).

3. METHODOLOGY

3.1. Data and sample

The study adopts a quantitative approach based on a sample of 101 respondents. The model is estimated using structural equation modelling in IBM SPSS AMOS. The available working paper does not specify the data collection period, the sampling method, the socio-demographic profile of the

respondents, the full content of the questionnaire or the measurement scale used. These elements must be included in the empirical protocol prior to any submission.

3.2. Assessment of data suitability

The reported KMO values are used to assess the suitability of the data for factor analysis. The available results relate to three constructs. No Bartlett's statistics or other validity or reliability indices are provided in the data analysed here.

Construct	KMO index
Customs modernisation	0.906
Customs digitalisation	0.905
Overall performance	0.935

Note: The figures are taken as reported for the study. The other assessments are not available in the source document.

3.3. Structural model

The structural relationships reported relate to three outcome dimensions: commercial performance, economic competitiveness and international image. The coefficients are presented in the form and with the precision as reported. The available information does not allow us to confirm whether these are standardised or unstandardised coefficients; they are therefore referred to below as estimated coefficients. The model's overall fit indices are not reported.

4. RESULTS

4.1. Relationships with trade performance

Three positive and statistically significant relationships are reported for trade performance. Customs modernisation has an estimated coefficient of 0.174 ($p = 0.009$). Procedural simplification has a coefficient of 0.315 ($p < 0.001$), whilst trade facilitation has a coefficient of 0.357 ($p < 0.001$). Of these three estimates, trade facilitation has the highest coefficient.

4.2. Digitalisation, competitiveness and international image

Customs digitalisation is positively associated with economic competitiveness, with an estimated coefficient of 0.576 ($p < 0.001$). For international image, the single window has a coefficient of 0.322 and advanced technologies a coefficient of 0.552 ($p < 0.001$). The p-value associated with the coefficient for the single window is not available in the reported results; its significance cannot therefore be confirmed here.

Estimated relationship	Coefficient	Reported p-value
Customs modernisation → Trade performance	0.174	0.009
Procedural simplification → Commercial performance	0.315	< 0.001
Trade facilitation → Trade performance	0.357	< 0.001
Customs digitalisation → Economic competitiveness	0.576	< 0.001
Single window → International image	0.322	Not disclosed
Advanced technologies → International image	0.552	< 0.001

Note: The coefficients and p-values are reproduced exactly as they appear in the available results. No p-value has been added for the one-stop shop.

5. DISCUSSION

The available results suggest that several dimensions of customs reform are associated with trade performance. The coefficients observed for procedural simplification and trade facilitation are higher than that for customs modernisation in the reported relationships. This pattern is consistent with the idea that performance depends not only on general reforms, but also on operational changes that make the movement of goods smoother and more predictable.

The link between digitalisation and economic competitiveness highlights the role of information systems in the transformation of customs services. In the Moroccan context, BADR and PortNet are key institutional infrastructures for the digitisation and coordination of operations. However, the reported coefficient does not, on its own, allow us to establish a causal mechanism or to measure the specific effect of each of these platforms.

The coefficients associated with the single window and advanced technologies also highlight the value of examining coordination and control tools when analysing the country's international image. As the p-value for the one-stop shop is not available, this relationship must be interpreted with caution. Similarly, in the absence of overall goodness-of-fit indices, it is not possible to draw conclusions regarding the overall goodness-of-fit of the structural model.

Finally, the results must be understood within the limitations of the available methodological information. Whilst the sample size is known, the methods used to recruit respondents, the composition of the sample, the measurement scales and the robustness tests are not documented here. These details are necessary to assess the external validity of the results and to enable the analysis to be replicated.

CONCLUSION

This article has examined the relationships between customs modernisation, procedural simplification, trade facilitation, digitalisation and economic outcomes in Morocco. The estimates reported show positive and significant associations between modernisation, simplification and trade facilitation on the one hand, and trade performance on the other, as well as a positive association between digitalisation and economic competitiveness. Advanced technologies are also associated with international reputation, with a coefficient of 0.552 ($p < 0.001$). The coefficient for the single window system is 0.322, but its p-value is not available.

These results support the value of an integrated approach to customs reforms, linking procedures, digital tools and institutional coordination. To finalise the article for submission, it will be necessary to add details of the data collection protocol, the sample characteristics, the model's goodness-of-fit indices, the complete measurement results and the full bibliographical references. This step will help to strengthen methodological transparency without altering the results presented here.

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