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Fiscal Incentives and Technological FDI in Morocco: Short-run dynamics and territorial competitiveness in the Age of AI

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ABSTRACT

Foreign direct investment (FDI) in technology is a key way for emerging countries to improve their production systems, spread new ideas, and accelerate their digital transformation. Morocco uses tax breaks and exemptions to draw investments in high-tech and AI-driven industries. This is because global competition in the digital world is getting tougher. Still, there isn't much real-world evidence on how well these rewards work. This research examines how tax breaks affect the amount and location of technology-related foreign direct investment, accounting for factors such as digital growth, AI readiness, and competitive advantages. An autoregressive distributed lag (ARDL) model is used to distinguish between short- and long-run effects, using annual time-series data from 2005 to 2023. The results show that fiscal benefits lead to only small, short-term increases in technological FDI, with almost no long-term effect. Short-term changes are mainly driven by trade openness and the overall state of the economy. Long-term investment choices are based on the quality of digital infrastructure, the readiness of AI, and the capacity of transportation. These results show that competition based on incentives alone is not sufficient. They show how important it is to have stable fiscal frameworks supported by strong digital ecosystems and effective local government.

Keywords
Fiscal incentives, Technological FDI, Territorial competitiveness, Digital transformation, AI

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INTRODUCTION

Technological foreign direct investment (FDI) has become a central driver of productive upgrading, innovation diffusion, and digital transformation in emerging economies. Beyond classical perspectives on capital accumulation and productivity growth (Solow, 1956; Chenery & Strout, 1966), a substantial body of literature highlights the role of technology-intensive FDI in reducing competitiveness gaps through knowledge transfer, organizational modernization, and the adoption of advanced technologies (Blomström & Kokko, 2003). As global value chains are increasingly shaped by artificial intelligence (AI) and digitalization, attracting innovative investment has become a strategic priority for countries seeking to strengthen their industrial capabilities and secure sustainable integration into international production networks. In this context, fiscal incentives—such as tax holidays, R&D tax credits, preferential regimes, and zone-based advantages—have gained prominence in FDI attraction policies (UNCTAD, 2004; OECD, 2007). However, their effectiveness remains debated. While such incentives may influence multinational firms' location decisions, several studies point to risks of windfall effects, harmful tax competition, and fiscal losses when incentive schemes are poorly designed or insufficiently targeted (James, 2013). In the era of artificial intelligence, these instruments must also be assessed in relation to emerging determinants of technological investment, including digital infrastructure quality, the availability of skilled human capital, and territorial governance capacities. Recent global trends indicate that multinational firms are no longer driven solely by cost advantages. Instead, they increasingly favor regions offering robust digital infrastructures, stable regulatory environments, and innovation ecosystems aligned with advanced technologies (UNCTAD, 2022; UNCTAD, 2024). As a result, technological FDI has become more selective and geographically concentrated, favoring territories with mature digital systems and clear industrial upgrading strategies. These developments reinforce the need to understand how fiscal incentives interact with territorial competitiveness in countries pursuing technological development.

Morocco provides a relevant case to explore these dynamics. Over the past two decades, the country has implemented a diversified set of fiscal incentives through industrial acceleration zones, R&D frameworks, and sector-specific regimes to attract technology-intensive investments, particularly in the automotive, aeronautics, electronics, and digital services sectors. While these measures have supported Morocco's integration into global value chains, the actual impact of fiscal incentives on the attraction and spatial distribution of technological FDI remains insufficiently documented, especially from the perspective of territorial competitiveness and the capacity of regions to retain high-value-added projects over time. The existing literature on Morocco has largely focused on macroeconomic determinants of FDI or the performance of export-oriented industrial zones, without clearly distinguishing technology-intensive investments from other forms of capital inflows. Moreover, the specific effect of fiscal incentives on high-tech FDI is rarely examined through a territorial lens, despite the growing role of regions in international investment competition. At a time when artificial intelligence is reshaping production models and industrial strategies, this gap constrains the design of coherent, well-targeted, and fiscally sustainable public policies.

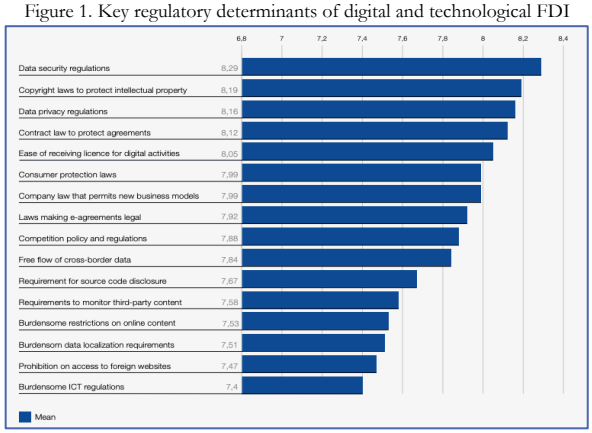
Against this background, this study examines the extent to which fiscal incentives influence the attraction and spatial allocation of technology-intensive FDI in Morocco, and how these instruments interact with territorial competitiveness in the era of artificial intelligence. It provides empirical evidence by assessing the temporal effects of fiscal incentives on technological FDI inflows and their interaction with

key structural determinants, including digital maturity, AI readiness, logistics infrastructure, and macroeconomic conditions, without presupposing their effectiveness in shaping multinational firms' location decisions.

Theoretical and Conceptual Framework

Technological foreign direct investment (FDI) is widely recognized as a key engine of productive upgrading and industrial transformation. Foundational contributions show that FDI accelerates technological diffusion, strengthens local absorptive capacities, and narrows innovation gaps between emerging economies and technological leaders (Eaton & Kortum, 2002; Gong & Keller, 2003). Empirical evidence corroborates these insights, indicating that the presence of multinational enterprises enhances local productivity, stimulates innovation activity, and fosters international knowledge linkages (Xu, 2000; Branstetter, 2001). Insights from the World Economic Forum (2020) further emphasize that the determinants of digital and technology-intensive FDI extend beyond fiscal considerations. High-tech investors increasingly prioritize data security, intellectual property protection, reliable digital regulatory frameworks, and institutional stability.

Figure 1. Key regulatory determinants of digital and technological FDI



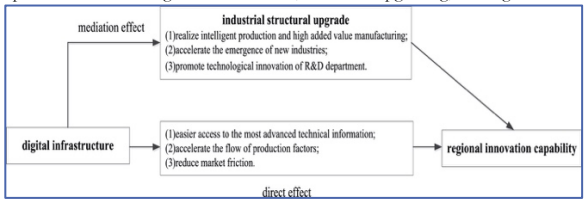
Source: World Economic Forum (2020), Digital FDI: Policies, Regulations and Measures to Attract FDI in the Digital Economy

As shown in Figure 1, factors such as data security regulations, copyright and intellectual property protection, digital privacy frameworks, and the ease of obtaining digital business licenses play a central role in shaping the location choices of high-technology investors. Territorial competitiveness therefore depends on the ability of local ecosystems to provide a secure, predictable, and innovation-friendly digital environment. Taken together, these findings indicate that technological FDI is highly sensitive to the quality of digital ecosystems, with fiscal incentives constituting only one component of a broader attractiveness strategy.

Fiscal incentives—such as R&D tax credits, preferential sectoral regimes, and advantages granted within industrial acceleration zones—remain central instruments for attracting technology-intensive investment. These mechanisms reduce entry costs, support innovative project financing, and signal policy predictability, thereby helping emerging economies structure nascent technological ecosystems (Montmartin & Herrera, 2015). However, the literature points to mixed effectiveness. Incentives may crowd out private innovation efforts (Görg & Strobl, 2007) or generate low additionality when firms respond opportunistically rather than strategically (James, 2013; OECD, 2007). Their impact is also strongly conditioned by institutional quality and governance arrangements, as flexible and decentralized frameworks tend to yield more significant technological spillovers (Guo et al., 2016). Crucially, fiscal incentives cannot substitute for the structural foundations of territorial competitiveness—skilled human capital, robust digital infrastructure, regulatory stability, innovation capacity, and industrial clusters. Poorly calibrated schemes may attract footloose investment, intensify harmful tax competition, or impose high fiscal costs without generating sustained technological benefits. The Moroccan case illustrates these dynamics: while tax regimes in industrial zones do attract technology-oriented firms, long-term anchoring depends fundamentally on the availability of local skills and the strength of regional innovation ecosystems. Fiscal incentives therefore function as complementary levers rather than primary determinants of technological FDI.

The high-tech literature emphasizes that territorial competitiveness increasingly relies on structural factors—innovation capacity, infrastructure quality, skilled labor, governance performance, and economic openness—whose configuration shapes regions' ability to attract and retain technological FDI. These factors are deeply territorialized, reflecting regional disparities in technological readiness and the heterogeneity of innovation ecosystems. In the context of territorial competition, artificial intelligence (AI) operates primarily as a general-purpose enabling technology that reshapes the locational requirements of technology-intensive activities. AI influences territorial attractiveness by increasing the value of data-related infrastructures, reliable connectivity, cybersecurity, and the availability of specialized skills, thereby raising the premium placed on mature digital ecosystems. Consequently, AI interacts with technological FDI less as a standalone "factor" than as a mechanism that amplifies the importance of complementary territorial assets—digital infrastructure, human capital, regulatory predictability, and innovation networks—that condition firms' capacity to deploy data-intensive processes. In this perspective, competitiveness in the AI era is reinforced when regions can credibly combine these structural capabilities with coherent public strategies, enabling technology-oriented investors to reduce operational uncertainty and scale innovation more effectively. Digital infrastructure has become a critical determinant, particularly in the context of artificial intelligence. Advanced connectivity (5G), fiber-optic networks, data centers, cloud computing capabilities, and digital platforms form an integrated system that enables data processing, circulation, and storage—now essential production inputs in the digital economy (Du & Wang, 2024).

Figure 2. Conceptual link between digital infrastructure, industrial upgrading, and regional innovation capacity



Source: Digital infrastructure and innovation(Du & Wang, 2024)

As shown in Figure 2, digital infrastructure acts as a foundational enabler of regional innovation capacity and industrial upgrading, illustrating that territorial competitiveness depends primarily on structural assets rather than isolated fiscal measures. Evidence from European experiences further indicates that technological attractiveness relies more on robust infrastructure and predictable regulatory environments than on standalone fiscal incentives. In advanced digital ecosystems, digital platforms operate as quasi-public goods, generating widespread positive externalities. Consequently, territorial advantage in the AI era rests on an integrated package combining:(i) advanced digital infrastructure; (ii) interconnected innovation ecosystems; (iii) stable and transparent regulatory frameworks; and (iv) targeted fiscal incentives aligned with structural priorities. Regions that meet these conditions are more likely to attract durable technological FDI and generate substantial upgrading effects. This conceptual perspective supports a nuanced understanding of the Moroccan context, in which fiscal incentives must be aligned with deeper structural reforms to enhance technological FDI attractiveness and territorial competitiveness.

MATERIALS AND METHODS

Study design and methodological approach

This study employs a quantitative empirical design based on annual data spanning the period 2003–2024, compiled from nationally and internationally recognized statistical sources. The analysis examines the determinants of technological foreign direct investment (FDI), operationalized as greenfield investment projects in information and communication technologies (ICT), electronics, research and development (R&D), and other advanced technology–intensive sectors, as reported in UNCTADstat. The empirical framework integrates three interrelated analytical dimensions: (i) fiscal incentives, (ii) structural determinants of territorial competitiveness, and (iii) digital readiness and artificial intelligence (AI) preparedness. All variables were harmonized into consistent annual time series and systematically validated to ensure temporal coherence and cross-source comparability. Where appropriate, variables were transformed into logarithmic form to stabilize variance and enable elasticity-based interpretation of estimated coefficients.

Data sources, variables, and period of study

Technological foreign direct investment (FDI) data were sourced from UNCTADstat, while indicators of fiscal incentives—measured by the ratio of tax expenditures to gross domestic product (GDP)—were obtained from the official Tax Expenditure Reports published annually by the Moroccan Ministry of Economy and Finance. Structural determinants of territorial competitiveness include logistics integration, proxied by container port traffic in twenty-foot equivalent units (TEUs); digital connectivity, measured through fixed broadband subscriptions and the number of secure internet servers per million inhabitants; trade openness; and economic growth. The analysis also incorporates an artificial intelligence readiness index (IA_ready), constructed from indicators provided by the World Bank, the International Telecommunication Union (ITU), and the OECD. Together, these variables capture the fiscal, digital, logistical, and macroeconomic dimensions shaping Morocco's technological FDI attractiveness. Although the official publication of tax expenditure data began in 2005, the dataset includes indicative values for 2003–2004 to preserve temporal continuity. From 2005 onward, annual tax expenditure figures are consistently available in the annexes of the Finance Laws. Fiscal incentives are operationalized through the ratio of tax expenditures to GDP (DepFisc_GDP), which captures the overall fiscal effort devoted to preferential investment schemes. This indicator reflects the budgetary cost of tax holidays, sectoral exemptions, and incentive regimes reported annually in the Moroccan *Tax Expenditure Reports*, rather than statutory corporate tax rates. The technological and artificial intelligence dimension is proxied by an AI readiness index (IA_ready), constructed as a composite measure of digital connectivity, human capital, and digital infrastructure. This index does not measure AI adoption directly, but rather the structural preparedness of the territory to host data-intensive and AI-related investment activities. Technological FDI data are sourced from UNCTADstat, while fiscal indicators are obtained from official publications of the Moroccan Ministry of Economy and Finance. Digital and AI-related indicators are drawn from harmonized datasets provided by the World Bank (WDI), the International Telecommunication Union (ITU), and the OECD, ensuring consistency and comparability over time.

Table 1. Variable description, definitions, units, and sources

Variable	code	Definition	Unit	Source
Year	Year	Annual observation period	2003–2024	Author compilation
Technological FDI	IDE_Tech	Number of announced greenfield technological projects in ICT, electronics, electrical equipment and R&D	Number of projects	UNCTADstat
Tax Expenditures / GDP	DepFisc_GDP	Ratio of tax expenditures to GDP	% of GDP	Tax Expenditure Reports – MEF Morocco
AI Readiness	IA_ready	Composite index: connectivity, human capital, digital infrastructure	Normalized index (0–1)	World Bank / ITU / OECD
Fixed Broadband	Broadband	Fixed broadband subscriptions (≥256 kbit/s)	Subscriptions per 100 inhabitants	WDI
Secure Servers	SecureServers	Secure internet servers (proxy for digital maturity and data security)	Per million inhabitants	WDI
Port Traffic (containers)	TEU	Container traffic handled in Moroccan ports (loading, unloading, transshipment)	Number of TEUs	WDI – IS.SHP.GOOD.TU
Economic Growth	Growth	Real GDP growth rate	%	WDI
Trade Openness	Openness	(Exports + Imports) / GDP	% of GDP	WDI

Source: Author-made table from UNCTADstat, Tax Expenditure Reports (MEF Morocco), World Bank (WDI), ITU, OECD, and Moroccan port authorities.

The introduction of the IA_ready variable enables the model to capture the technological preparedness of the territory as a key factor shaping the location of innovative FDI. This approach is consistent with Morocco's ongoing digital transition and with recent UNCTAD (2022, 2024) recommendations, which emphasize that the attraction of technological FDI depends not only on fiscal incentives, but also on territories' capacity to provide advanced digital infrastructure, skilled human capital, and an environment conducive to artificial intelligence. The empirical analysis employs the Autoregressive Distributed Lag (ARDL) model developed by Pesaran, Shin, and Smith (2001). This specification is particularly appropriate given the mixed integration orders of the variables (I(0)/I(1)) and the relatively small annual dataset covering the period 2005–2023. The ARDL framework allows for the simultaneous estimation of short-run dynamics and long-run relationships between technological FDI and its determinants, while accounting for time lags inherent in investment decisions and the gradual activation of fiscal incentives and digital capacities. The general ARDL (p, q_1, …, q_k) specification is written as follows:

$$IDE\_Tech_t = \alpha_0 + \sum_{i=1}^{p} \emptyset_i \, IDE\_Tech_{t-i} + \sum_{j=0}^{q_1} \beta_j \, DepFisc\_GDP_{t-j} + \sum_{j=0}^{q_2} \gamma_j \, IA\_ready_{t-j} + \sum_{j=0}^{q_3} \delta_j \, Broadband_{t-j} + \sum_{j=0}^{q_4} \theta_j \, TEU_{t-j} + \sum_{j=0}^{q_5} \lambda_j \, Growth_{t-j} + \sum_{j=0}^{q_6} \mu_j \, Openness_{t-j} + \varepsilon_t$$

When cointegration is confirmed through the bounds testing procedure, the ARDL model is re-expressed in its Error Correction Model (ECM) form, incorporating a negative adjustment parameter that captures the speed at which deviations from the long-run equilibrium are corrected.

RESULTS AND DISCUSSION

ARDL Unit Root Tests

Augmented Dickey–Fuller (ADF) unit root tests were applied to all variables to determine their order of integration (Table 2). The results indicate a mixed integration structure, which is consistent with the use of the ARDL framework, as it is suitable when variables are integrated of order I(0) and/or I(1) (Pesaran et al., 2001).

Table 2. Augmented Dickey–Fuller (ADF) unit root tests

Variable	Level : ADF stat	p-value	Stationary ?	1st Difference : ADF stat	p-value	Stationary ?	Order of Integration
IDE_Tech	–3.288	0.015	Yes	—	—	—	I(0)
DepFisc_GDP	–1.163	0.689	No	—	—	—	I(1)
Broadband	1.952	0.998	No	—	—	—	I(1)
TEU	1.171	0.9958	No	—	—	—	I(1)
Growth	–6.206	0.0000	Yes	—	—	—	I(0)
Openness	–1.625	0.4699	No	—	—	—	I(1)
IA_ready	1.952	0.9986	No	–2.367	0.1511	Partially	I(1)

Notes: The 5% ADF critical value is approximately –3.00. None of the variables is integrated of order two, I(2), which satisfies the key requirement for applying the ARDL model (Pesaran, Shin & Smith, 2001).

Technological FDI (IDE_Tech) and real GDP growth are stationary in levels (I(0)), whereas the ratio of tax expenditures to GDP (DepFisc_GDP), trade openness, fixed broadband, port container traffic (TEU), and the AI readiness index (IA_ready) are non-stationary in levels but become stationary after first differencing, indicating integration of order one, I(1). No variable is integrated of order two, which is a necessary condition for the validity of the ARDL approach. This configuration reduces the risk of spurious regression and supports the choice of the ARDL framework given the relatively short annual sample.

Bounds test for cointegration

Table 3. ARDL bounds test results

Test	F-Statistic	Critical value (5 %– I(1))	Decision
ARDL bounds test	0.32	3.35	No cointegration

Note: The F-statistic lies below both the lower and upper critical bounds (I(0) and I(1)), indicating the absence of a long-run relationship.

The F-statistic obtained from the joint significance test of the long-run coefficients is $F(5,6) = 0.32$ (Prob > F = 0.8859). This value lies well below the conventional critical bounds, even at the 10% significance level ($I(0) \approx 2.26$; $I(1) \approx 3.35$). Consequently, the null hypothesis of no cointegration cannot be rejected. These findings indicate that, over the period 2005–2023, the variables do not form a stable long-run equilibrium relationship. This result is consistent with the absence of statistically significant long-run coefficients in the ARDL model, suggesting that short-run dynamics dominate the behavior of technological FDI in Morocco during the study period.

ARDL Estimation Results

Table 4. ARDL estimation results – Determinants of technological FDI in Morocco (2005–2023)

Variables	Coefficient	Standard Error	Sig.
Long-run coefficients (LR)			
DepFisc_GDP	78.435	71.360	ns
IA_ready	183.551	169.925	ns
TEU	0.000019	0.000026	ns
Growth	24.083	25.234	ns
Openness	–9.863	8.888	ns
Short-run coefficients (SR)			
ΔDepFisc_GDP	–62.027	25.681	*
ΔDepFisc_GDP(–1)	–41.471	17.126	*
ΔGrowth	–12.284	7.381	ns
ΔGrowth(–1)	–6.997	3.244	*
ΔOpenness	5.830	2.445	*
ΔOpenness(–1)	3.725	1.773	*
Constant	158.527	94.562	ns

Note: *p < 0.10 → * ; p < 0.05 → ** ; p < 0.01 → *** ; ns = not significant.

Long-run coefficients

Table 4 reports the ARDL estimation results. In the long run, none of the explanatory variables—fiscal incentives (DepFisc_GDP), AI readiness (IA_ready), port activity (TEU), economic growth, or trade openness—exerts a statistically significant effect on technological FDI inflows. This absence of long-run significance suggests that fiscal incentives do not operate as a structural determinant of technological FDI location in Morocco. This finding echoes James (2013), who argues that tax advantages rarely generate durable effects when they are not embedded within a robust innovation ecosystem. Similarly, the positive but statistically insignificant coefficient for IA_ready indicates that improvements in digital and AI-related capacity have not yet translated into a persistent increase in technological FDI. This interpretation is consistent with UNCTAD (2022), which notes that technology-intensive investments often respond slowly to digital capacity upgrades due to delays in skills formation, technology adoption, and infrastructure deployment. Port container traffic and trade openness also display no significant long-run effects on technological FDI, in line with Harding and Javorcik (2011), who find that high-tech FDI in emerging economies responds more strongly to governance quality, human capital, and innovation capacity than to traditional openness indicators.

Short-run dynamics

By contrast, the short-run coefficients reveal a more pronounced sensitivity of technological FDI to recent shocks. The ratio of tax expenditures to GDP exerts a negative and statistically significant effect in the short run, both contemporaneously and with one lag (ΔDepFisc_GDP and ΔDepFisc_GDP(–1), $p \approx 0.05$). This result indicates that an increase in fiscal effort—interpreted as a higher budgetary

cost of incentive schemes—is associated with an immediate reduction in technological FDI inflows. Two mechanisms may account for this pattern. First, frequent revisions and expansions of preferential regimes can generate fiscal uncertainty, which is particularly detrimental for technology-intensive multinationals that value stability and predictability (Klemm & Van Parys, 2012). Second, overly generous incentives may attract opportunistic rather than genuinely technology-intensive projects, reflecting a form of adverse selection widely discussed in the literature (OECD, 2007; Torgler & Schneider, 2009). Lagged real GDP growth (ΔGrowth(–1)) also displays a negative and marginally significant effect, suggesting that past deteriorations in macroeconomic conditions dampen technological FDI in the short run. This interpretation is consistent with Barrell and Pain (1996), who show that high-tech investments in emerging economies are highly sensitive to cyclical fluctuations and perceived macroeconomic risk. By contrast, trade openness exerts a positive and statistically significant short-run effect on technological FDI, both contemporaneously and with one lag (ΔOpenness and ΔOpenness(–1)). This finding implies that greater international trade integration facilitates the rapid arrival of new technological projects by improving access to strategic inputs, accelerating integration into global value chains, and easing imports of high-tech capital goods. This result aligns with Kose et al. (2009), who emphasize the role of trade openness as a channel for technology diffusion in emerging economies.

Error-correction term and diagnostic tests

The estimated error-correction term (ECT) exhibits the expected negative sign, indicating a tendency for deviations between technological FDI and its determinants to be corrected over time. However, in light of the bounds test results, evidence of a robust and stable long-run equilibrium remains limited, and the adjustment mechanism should therefore be interpreted with caution. Standard diagnostic checks were conducted to assess the reliability of the ARDL specification. The Breusch–Godfrey tests do not indicate problematic autocorrelation, and White's test does not reveal severe heteroskedasticity. Residual diagnostics suggest no major structural anomalies, supporting the overall stability and adequacy of the estimated model over the period considered.

Table 5. Overall ARDL model statistics

Statistic	Value
Number of observations	19
R^2	0.895
Adjusted R^2	0.686
Root MSE	15.11
Log-likelihood	–67.60
AIC	12.37
BIC	12.89

The empirical findings reveal a distinctive pattern of technological foreign direct investment (FDI) dynamics in Morocco that partly diverges from recent international evidence on digital FDI. While several studies suggest that fiscal incentives can enhance the attractiveness of emerging economies for digital and technology-intensive investment (UNCTAD, 2022; Liu & Seric, 2023), the present analysis indicates that such incentives in Morocco generate only short-lived effects, with no robust long-run impact. This divergence can be attributed to the transitory nature of Moroccan tax regimes and the incomplete consolidation of the national innovation ecosystem. Frequent revisions to incentive schemes, combined with still-developing digital and innovation capacities, contrast with the more stable institutional and technological environments examined in much of the international literature. Similarly, the absence of long-run significance for digital and AI-related variables—such as AI readiness, broadband penetration, and secure servers—departs from findings emphasizing digital maturity as a central determinant of high-tech FDI location (Alfaro & Chen, 2018; OECD, 2020). This suggests that, although Morocco has made notable progress in digital development, the threshold levels of infrastructure quality and specialized skills required to generate sustained long-term effects have not yet been fully attained.

These results contribute to ongoing debates on the effectiveness of fiscal incentives under conditions of technological transformation by demonstrating that tax-based instruments tend to influence technological FDI primarily in the short run rather than as durable locational determinants. The negative short-run impact of tax expenditures, in particular, may reflect fiscal uncertainty or imperfect targeting, consistent with arguments advanced by James (2013) and Klemm and Van Parys (2012) regarding windfall gains and ineffective tax competition. Moreover, the limited role of contemporaneous economic growth supports the view that technology-intensive investors respond less to short-term growth performance than to macroeconomic stability and credible policy frameworks (Barrell & Pain, 1996). By contrast, the positive short-run effect of trade openness aligns with the logic of global digital value chains (Baldwin, 2016), whereby economies capable of rapidly importing key technological inputs and integrating into international production networks are better positioned to attract technology-driven projects. Overall, the findings underscore that while Morocco possesses important assets for technological FDI attraction, transforming episodic inflows into durable, high-value territorial anchoring requires the consolidation of a comprehensive digital ecosystem encompassing advanced infrastructure, specialized human capital, predictable governance, and carefully calibrated fiscal incentives. In this perspective, fiscal policy should be conceived as a complementary instrument, aligned with deeper structural reforms aimed at strengthening territorial competitiveness in the age of artificial intelligence.

Conclusion and Recommendations

The empirical findings indicate that Morocco's technological foreign direct investment (FDI) attractiveness is driven predominantly by short-run dynamics rather than by consolidated structural factors. Fiscal incentives exhibit immediate yet unstable effects, with increases in fiscal effort associated with short-term declines in technological FDI, suggesting that frequent adjustments or overly generous schemes may generate investor uncertainty and adverse selection. In contrast, trade openness exerts a positive short-run influence, confirming the importance of international integration and participation in global value chains for attracting technology-intensive projects. Structural variables—such as AI readiness, digital maturity, and port activity—do not display statistically significant long-run effects over the study period, indicating that the foundations of digital-based territorial competitiveness in Morocco remain insufficiently developed. The absence of long-run cointegration, as revealed by the ARDL bounds test, further suggests that the observed relationships are largely transitory and should be interpreted as short-run transmission mechanisms rather than stable structural linkages.

These results carry important policy and research implications. Fiscal incentives should be repositioned as complementary rather than primary instruments of technological attractiveness, with greater emphasis placed on stability, targeting, and alignment with regional absorptive capacities. A more effective strategy would integrate fiscal tools with sustained investment in digital infrastructure, AI-related skills, innovation ecosystems, and coordinated territorial governance, ensuring coherence between tax policy and Morocco's broader digital

and AI strategies. Methodologically, while the ARDL approach proves suitable for capturing short-run dynamics under mixed integration orders, the analysis is constrained by data limitations, potential omitted variables, and the inability to account for non-linearities or endogeneity. Future research could therefore extend the analysis through regional or sectoral disaggregation, non-linear models, and causal inference techniques, alongside richer indicators of digital governance, AI adoption, and cybersecurity. Overall, the study underscores that in the artificial intelligence era, durable technological competitiveness cannot be achieved through fiscal policy alone but depends fundamentally on the consolidation of digital ecosystems, institutional quality, and territorially embedded development strategies.

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Conflict of Interest

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