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ARTIFICIAL INTELLIGENCE AND ECONOMIC GROWTH: DOES INSTITUTIONAL QUALITY MATTER? EVIDENCE FROM EUROPEAN ECONOMIES

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ABSTRACT

Artificial intelligence (AI) is increasingly transforming production, innovation, productivity, and organizational processes, yet its contribution to economic growth may depend critically on the institutional environment in which technological adoption takes place. This study examines the relationship between AI adoption, institutional quality, and economic growth across European economies, focusing specifically on the moderating role of governance.

Institutional quality is captured through the six Worldwide Governance Indicators: Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption, Political Stability and Absence of Violence/Terrorism, and Voice and Accountability. The empirical framework evaluates both the direct effects of AI adoption and institutional quality and their interaction effects.

The study introduces the concept of **institutional absorptive capacity**, arguing that stronger institutions facilitate the transformation of technological opportunities into measurable productivity and economic growth. By examining governance dimensions separately, the analysis identifies which institutional characteristics are particularly important for strengthening the economic returns to AI.

The empirical findings indicate that AI adoption is positively associated with economic growth, but the magnitude of this effect depends significantly on the institutional environment. Regulatory Quality and Government Effectiveness emerge as the strongest moderators of the AI–growth relationship, followed by Rule of Law and Control of Corruption. Political Stability exhibits a weaker positive moderating effect, while Voice and Accountability does not generate a statistically significant interaction effect.

Overall, the findings support the central proposition that **the economic returns of artificial intelligence are institution-dependent**. The results suggest that policies aimed exclusively at increasing AI adoption may be insufficient unless accompanied by institutional reforms capable of improving regulatory predictability, public-sector effectiveness, contract enforcement, transparency, and the efficient allocation of technological resources.

KEYWORDS: Artificial Intelligence; Economic Growth; Institutional Quality; Governance; Digital Economy; European Economies; Institutional Absorptive Capacity.

JEL Classification: O33; O43; C23; E02; O52.

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1.0 INTRODUCTION

Artificial intelligence has emerged as a potentially transformative general-purpose technology capable of affecting productivity, innovation, production processes, business organization, and labor allocation. Through automation, advanced data processing, predictive analytics, machine learning, and decision-support systems, AI can improve the efficiency with which capital and labor are employed and accelerate technological innovation.

The rapid diffusion of AI technologies has generated considerable interest among economists and policymakers regarding their potential contribution to long-run economic growth. AI may increase productivity by automating routine tasks, augmenting workers, improving decision-making, reducing information costs, and enabling firms to develop new products, services, and production processes.

However, technological adoption does not automatically translate into economic growth. The productivity gains associated with AI depend on complementary investments in human capital, digital infrastructure, organizational capabilities, data, intangible assets, and institutional structures. Consequently, economies with similar access to AI technologies may obtain substantially different economic returns.

This issue is particularly relevant in Europe. European economies share important elements of a common economic and regulatory framework but remain heterogeneous in AI adoption, productivity, innovation capacity, digitalization, and institutional quality. Such heterogeneity creates an appropriate environment for investigating whether the economic effects of AI depend on national institutional conditions.

Institutions influence investment incentives, contract enforcement, regulatory predictability, public-sector effectiveness, corruption, political stability, and the allocation of resources. Strong institutions may facilitate AI investment and diffusion, while institutional weaknesses may constrain the capacity of economies to transform technological adoption into productivity and economic growth.

The present study therefore treats institutional quality not merely as an additional determinant of economic performance but as a **moderating mechanism** in the AI–growth relationship.

The central research question is:

Does institutional quality enhance the effect of artificial intelligence adoption on economic growth in European economies?

The study contributes to the emerging literature in three principal ways.

First, it examines the AI–growth relationship from a European macroeconomic perspective. Second, it conceptualizes institutional quality as a complementary factor determining the economic returns to AI.

Third, instead of relying on a single composite governance index, it examines separately the six dimensions of the Worldwide Governance Indicators.

This distinction is important because different dimensions of institutional quality may affect technological diffusion through different mechanisms. Government Effectiveness may determine the capacity of the public sector to design and implement digital strategies. Regulatory Quality may influence the predictability of the business environment. Rule of Law may affect contract enforcement and intellectual-property protection. Control of Corruption may improve the allocation of public and private investment. Political Stability may reduce uncertainty surrounding long-term technological investment, while Voice and Accountability may influence transparency, trust, and policy legitimacy.

The central proposition of this paper is therefore:

The economic returns of artificial intelligence are institution-dependent.

The remainder of the paper is structured as follows. Section 2 reviews the relevant theoretical and empirical literature and develops the research hypotheses. Section 3 presents the data and econometric methodology. Section 4 reports the empirical findings. Section 5 discusses the results and develops their policy implications. Section 6 concludes.

2.0 LITERATURE REVIEW AND HYPOTHESES

2.1 Artificial Intelligence and Economic Growth

Endogenous growth theory emphasizes technological progress and innovation as fundamental drivers of long-run economic performance. Romer (1990) highlights the role of technological knowledge and innovation, while Aghion and Howitt (1992) emphasize creative destruction as a mechanism through which technological change contributes to economic growth.

Artificial intelligence can affect economic performance through several channels. Automation may increase productivity by replacing routine tasks, while worker augmentation can improve the efficiency and quality of human decision-making. AI can also reduce information costs, improve forecasting, support innovation, optimize supply chains, and improve the allocation of resources.

Aghion, Jones, and Jones (2019) emphasize that AI may have substantial implications for economic growth, particularly if it accelerates innovation and the production of new ideas. At the same time,

the macroeconomic effects of AI remain uncertain because technological diffusion requires complementary investments and institutional adjustments.

The general-purpose-technology perspective suggests that productivity gains may emerge gradually rather than immediately. Firms often need to reorganize production, train workers, develop complementary intangible assets, and modify managerial practices before new technologies generate measurable productivity improvements.

Brynjolfsson, Rock, and Syverson (2021) describe this adjustment mechanism as a **productivity J-curve**. The introduction of new technologies may initially require costly complementary investments before productivity benefits become visible in aggregate statistics.

Evidence at the worker level also supports the productivity-enhancing potential of artificial intelligence. Noy and Zhang (2023), for example, document substantial improvements in task performance following access to generative AI. Nevertheless, micro-level productivity improvements cannot automatically be translated into equivalent macroeconomic growth effects.

The first hypothesis is therefore:

H1: Artificial intelligence adoption has a positive effect on economic growth in European economies.

2.2 Institutional Quality and Economic Growth

Institutional economics identifies institutions as fundamental determinants of long-run economic development.

North (1990) argues that institutions shape economic incentives, reduce uncertainty, and influence transaction costs. Similarly, Acemoglu, Johnson, and Robinson (2005) emphasize that economic institutions fundamentally affect investment, innovation, productivity, and resource allocation.

Institutional quality may promote economic growth by improving contract enforcement, protecting property rights, reducing transaction costs, strengthening public administration, limiting corruption, and creating a predictable environment for investment.

Strong institutions may also improve the effectiveness of public expenditure and encourage both domestic and foreign investment. By contrast, weak institutions may generate uncertainty, distort resource allocation, reduce investor confidence, and limit the productivity of capital accumulation.

This leads to the second hypothesis:

H2: Higher institutional quality has a positive effect on economic growth in European economies.

The present study employs the six Worldwide Governance Indicators:

- Government Effectiveness (GE)
- Regulatory Quality (RQ)

- Rule of Law (RL)
- Control of Corruption (CC)
- Political Stability and Absence of Violence/Terrorism (PS)
- Voice and Accountability (VA)

Examining these dimensions separately makes it possible to identify whether some forms of institutional quality are more important than others for technological transformation.

2.3 Institutional Quality as a Moderator of the AI–Growth Relationship

The central argument of this study is that institutions influence not only economic growth directly but also the capacity of an economy to transform AI adoption into economic gains.

Strong Government Effectiveness can facilitate the implementation of digital policies, technological infrastructure, education strategies, and innovation programs.

Regulatory Quality can provide legal certainty while maintaining sufficient flexibility to encourage technological innovation.

Rule of Law can strengthen contract enforcement and intellectual-property protection, reducing risks associated with long-term technological investment.

Control of Corruption can improve the allocation of technological resources and reduce distortions in public procurement and investment decisions.

Political Stability can reduce uncertainty surrounding long-term investment, while Voice and Accountability may strengthen transparency and public trust.

Accordingly:

H3: Institutional quality positively moderates the relationship between AI adoption and economic growth.

This general hypothesis is decomposed into six specific hypotheses:

H3a: Government Effectiveness positively moderates the AI–growth relationship.

H3b: Regulatory Quality positively moderates the AI–growth relationship.

H3c: Rule of Law positively moderates the AI–growth relationship.

H3d: Control of Corruption positively moderates the AI–growth relationship.

H3e: Political Stability positively moderates the AI–growth relationship.

H3f: Voice and Accountability positively moderates the AI–growth relationship.

The proposed mechanism can therefore be summarized as:

AI Adoption × Institutional Quality → Productivity → Economic Growth

The study does not assume that all six institutional interactions must necessarily have identical magnitude or statistical significance. Their relative importance remains an empirical question.

3.0 DATA AND METHODOLOGY

3.1 Data and Variables

The empirical analysis focuses on European economies and combines internationally comparable data from Eurostat, the World Bank, and the Worldwide Governance Indicators.

Economic growth is measured using the annual growth rate of real GDP.

The preferred AI measure is based on Eurostat's ICT usage and e-commerce survey and captures the percentage of enterprises with at least ten employees using at least one AI technology.

This indicator is particularly appropriate because it captures **realized enterprise adoption of AI**, rather than broader indicators of technological readiness or national AI potential.

Institutional quality is represented by the six Worldwide Governance Indicators.

The empirical specification additionally incorporates major macroeconomic determinants of growth, including gross fixed capital formation, human capital, trade openness, foreign direct investment, and inflation.

Table 1. Variables and DataSources

Variable	Definition	Source	ExpectedSign
GROWTH	Annualreal GDP growth (%)	World Bank / Eurostat	Dependent
AI	Enterprisesusing AI technologies (%)	Eurostat	+
GE	GovernmentEffectiveness	WGI	+
RQ	Regulatory Quality	WGI	+
RL	Rule of Law	WGI	+
CC	Control of Corruption	WGI	+
PS	PoliticalStability	WGI	+
VA	Voice and Accountability	WGI	+
GFCF	Grossfixedcapitalformation	WDI / Eurostat	+
HC	Human capitalindicator	Eurostat / WDI	+
TRADE	Trade openness	WDI	+
FDI	Foreign directinvestment	WDI	+
INF	Inflation	WDI / Eurostat	—

3.2 EconometricSpecification

The baseline relationship is specified as:

$$\text{Growth}_{it} = \alpha + \beta_1 \text{AI}_{it} + \beta_2 \text{INST}_{it} + \beta_3 (\text{AI}_{it} \times \text{INST}_{it}) + \gamma' \text{X}_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Where $Growth_{it}$ denotes economic growth, AI_{it} represents AI adoption, $INST_{it}$ denotes one of the six institutional indicators, X_{it} represents the vector of control variables, μ_i captures country-specific effects, and λ_t captures time effects.

The three central coefficients correspond directly to the hypotheses:

$\beta_1 \rightarrow H1$

$\beta_2 \rightarrow H2$

$\beta_3 \rightarrow H3 / H3a-H3f$

The marginal effect of AI on economic growth is given by:

$$\partial Growth_{it} / \partial AI_{it} = \beta_1 + \beta_3 INST_{it}$$

A positive and statistically significant β_3 therefore indicates that the growth effect of AI increases as institutional quality improves.

Six separate interaction models are estimated, one for each WGI dimension. This approach avoids treating governance as homogeneous and reduces problems associated with the high correlation among institutional indicators.

Given the dynamic nature of economic growth, the empirical specification additionally includes lagged economic growth:

$$Growth_{it} = \alpha + \rho Growth_{i,t-1} + \beta_1 AI_{it} + \beta_2 INST_{it} + \beta_3 (AI_{it} \times INST_{it}) + \gamma' X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

Potential endogeneity is relevant because economic growth may itself affect AI adoption, while stronger economies may possess greater resources for technological investment.

A dynamic panel approach therefore provides an appropriate empirical framework.

4.0 EMPIRICAL RESULTS

4.1 Descriptive Statistics

Table 2. Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
GROWTH	486	2.47	3.61	-10.17	13.84
AI	486	11.82	9.46	0.74	43.27
GE	486	1.05	0.62	-0.48	2.24
RQ	486	1.09	0.58	-0.41	2.18
RL	486	1.03	0.65	-0.53	2.12
CC	486	0.94	0.71	-0.62	2.31

PS	486	0.69	0.54	-0.78	1.62
VA	486	1.01	0.48	-0.32	1.69
GFCF	486	22.36	4.18	11.74	37.61
HC	486	38.74	8.63	18.52	58.91
TRADE	486	104.28	67.42	24.11	392.37

The descriptive statistics reveal substantial heterogeneity across European economies.

Average real GDP growth equals 2.47%, while the average share of enterprises using at least one AI technology equals 11.82%. The relatively large standard deviation of AI adoption indicates substantial differences in technological diffusion across countries.

The institutional indicators are generally positive, but important cross-country variation remains. Regulatory Quality records the highest average score, followed closely by Government Effectiveness and Rule of Law.

Political Stability exhibits a lower mean and considerable variation, reflecting differences in political and geopolitical conditions across European economies.

The substantial heterogeneity observed in AI adoption and institutional quality supports the central motivation of the empirical analysis: countries with different institutional environments may obtain substantially different economic returns from comparable levels of technological adoption.

4.2 AI, Institutional Quality and Economic Growth

Table 3. Dynamic Panel Estimates

Variables	GE	RQ	RL	CC	PS	VA
GROWTH(t-1)	0.284*	0.276*	0.291*	0.279*	0.287*	0.281*
	(0.061)	(0.060)	(0.062)	(0.061)	(0.061)	(0.060)
AI	0.073*	0.068*	0.071*	0.066*	0.064*	0.061
	(0.022)	(0.021)	(0.022)	(0.021)	(0.022)	(0.025)
InstitutionalIndicator	0.418*	0.463*	0.397	0.351	0.286	0.214
	(0.142)	(0.148)	(0.158)	(0.151)	(0.139)	(0.103)
AI × InstitutionalIndicator	0.031*	0.038*	0.029	0.026	0.018*	0.011
	(0.010)	(0.011)	(0.012)	(0.011)	(0.010)	(0.009)
GFCF	0.126*	0.121*	0.128*	0.124*	0.130*	0.127*
	(0.038)	(0.037)	(0.039)	(0.038)	(0.039)	(0.038)
HC	0.047	0.045	0.049	0.046	0.044	0.043
	(0.021)	(0.020)	(0.021)	(0.021)	(0.020)	(0.020)
TRADE	0.008	0.009	0.008	0.008	0.007*	0.007*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
FDI	0.021*	0.020*	0.022	0.021*	0.019*	0.020*

	(0.012)	(0.012)	(0.011)	(0.012)	(0.011)	(0.012)
INF	-0.083	-0.079	-0.081	-0.085	-0.078	-0.080
	(0.036)	(0.035)	(0.036)	(0.037)	(0.035)	(0.036)
Countryeffects	Yes	Yes	Yes	Yes	Yes	Yes
Timeeffects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	486	486	486	486	486	486

*** $p < 0.01$, * $p < 0.05$, $p < 0.10$. Standard errors in parentheses.

The lagged dependent variable is positive and statistically significant across all specifications. The coefficient ranges between approximately 0.276 and 0.291, suggesting persistence in economic growth dynamics. The results provide substantial support for the first hypothesis. AI adoption exhibits a positive coefficient in every model and is statistically significant in five of the six specifications.

The estimated direct AI coefficient ranges from 0.061 to 0.073. These findings indicate that greater enterprise adoption of AI is associated with stronger economic growth. The institutional indicators also exhibit positive coefficients across all specifications.

Government Effectiveness has a coefficient of 0.418 and is statistically significant at the 1% level. Regulatory Quality produces an even stronger estimate of 0.463. Rule of Law and Control of Corruption are also positive and statistically significant, while Political Stability produces a smaller positive effect. Voice and Accountability is positively associated with growth, although the magnitude and statistical strength of the coefficient are more limited.

The central empirical contribution, however, concerns the interaction between AI adoption and institutional quality.

The interaction between AI and Government Effectiveness equals **0.031** and is statistically significant at the 1% level. This indicates that more effective public administration increases the economic returns associated with AI adoption.

The strongest moderating effect is found for **Regulatory Quality**. The interaction coefficient equals **0.038** and is statistically significant at the 1% level. This suggests that predictable, coherent, and innovation-compatible regulatory environments substantially strengthen the growth impact of AI adoption.

The interaction between AI and Rule of Law equals **0.029** and is statistically significant at the 5% level. Stronger legal systems therefore appear to improve the ability of economies to translate technological adoption into economic gains. Control of Corruption produces a positive interaction coefficient of **0.026**, also statistically significant at the 5% level. This finding indicates that stronger control over corruption improves the allocation and effectiveness of technological investment. The interaction between AI and Political Stability is positive but smaller, with a coefficient of **0.018**, significant at the 10% level.

Finally, the interaction between AI and Voice and Accountability is positive at **0.011**, but statistically insignificant.

The results therefore indicate that institutional dimensions related directly to public-sector capacity, regulation, legal enforcement, and resource allocation appear to be particularly important in determining the macroeconomic returns to AI.

4.3 Interpretation of the Moderating Effects

The positive interaction coefficients imply that the marginal effect of AI on economic growth increases with institutional quality.

Recall that:

$$\partial \text{Growth} / \partial \text{AI} = \beta_1 + \beta_3 \text{INST}$$

For Government Effectiveness:

$$\partial \text{Growth} / \partial \text{AI} = 0.073 + 0.031 \text{GE}$$

For Regulatory Quality:

$$\partial \text{Growth} / \partial \text{AI} = 0.068 + 0.038 \text{RQ}$$

For Rule of Law:

$$\partial \text{Growth} / \partial \text{AI} = 0.071 + 0.029 \text{RL}$$

For Control of Corruption:

$$\partial \text{Growth} / \partial \text{AI} = 0.066 + 0.026 \text{CC}$$

For Political Stability:

$$\partial \text{Growth} / \partial \text{AI} = 0.064 + 0.018 \text{PS}$$

For Voice and Accountability:

$$\partial \text{Growth} / \partial \text{AI} = 0.061 + 0.011 \text{VA}$$

These expressions illustrate the concept of **institutional absorptive capacity**.

For example, the growth return associated with AI adoption becomes larger as Regulatory Quality improves. Economies characterized by more predictable and efficient regulation are therefore better positioned to convert technological adoption into measurable economic gains.

Similarly, stronger Government Effectiveness enhances the contribution of AI because effective public institutions can support technological infrastructure, education, innovation policy, digital public services, and the implementation of regulatory frameworks.

4.4 Macroeconomic Control Variables

Gross fixed capital formation produces a consistently positive and statistically significant coefficient across all specifications. This finding confirms the importance of investment for economic growth.

Human capital also has a positive effect, indicating that education and workforce capabilities complement technological adoption and economic development. Trade openness is positively related to growth. Greater exposure to international markets may facilitate technological diffusion, competition, specialization, and access to advanced technologies. Foreign direct investment is generally positive and statistically significant, suggesting that foreign capital contributes to productivity growth, technological transfer, and economic performance. Inflation has a negative and statistically significant coefficient in all models. Persistent inflationary pressures may increase uncertainty, distort investment decisions, and reduce the efficiency of resource allocation.

Overall, the signs of the control variables are consistent with conventional growth theory.

4.5 Summary of Hypothesis Testing

Table 4. Summary of Hypothesis Testing

Hypothesis	Relationship	Expected Sign	Result
H1	AI → Growth	+	Supported
H2	Institutional Quality → Growth	+	Partially Supported
H3	AI × Institutional Quality → Growth	+	Supported overall
H3a	AI × Government Effectiveness	+	Supported
H3b	AI × Regulatory Quality	+	Supported
H3c	AI × Rule of Law	+	Supported
H3d	AI × Control of Corruption	+	Supported
H3e	AI × Political Stability	+	Weakly Supported
H3f	AI × Voice and Accountability	+	Not Supported

The empirical evidence provides broad support for the theoretical framework developed in this paper.

H1: is supported because AI adoption displays a consistently positive relationship with economic growth.

H2: receives partial support because all six institutional indicators exhibit positive coefficients, although statistical significance varies across governance dimensions.

Most importantly, the evidence strongly supports the general moderating hypothesis, H3.

Five of the six institutional interaction terms are positive and statistically significant at conventional or marginal significance levels. Among these dimensions, **Regulatory Quality produces the strongest moderating effect**, with an interaction coefficient of 0.038. Government Effectiveness follows with a coefficient of 0.031, while Rule of Law and Control of Corruption produce coefficients of 0.029 and 0.026 respectively. Political Stability produces a weaker moderating effect of 0.018. Voice and Accountability does not generate a statistically significant moderating effect.

The findings therefore provide empirical support for the central proposition of the paper:

The economic returns of artificial intelligence are institution-dependent.

5.0 DISCUSSION AND POLICY IMPLICATIONS

The results suggest that AI adoption should not be viewed as an autonomous or automatic source of economic growth. Instead, its economic effects depend substantially on the ability of countries to absorb, govern, and productively exploit technological change. This distinction can be expressed as:

AI Adoption $\neq$ Automatic Economic Growth

Rather:

AI Adoption $\times$ Institutional Absorptive Capacity $\rightarrow$ Productivity $\rightarrow$ Economic Growth

The direct positive effect of AI confirms that technological adoption can contribute to economic performance. However, the interaction results demonstrate that this contribution increases when AI operates within stronger institutional environments. The strongest result concerns Regulatory Quality. The interaction coefficient of 0.038 suggests that regulatory institutions play a particularly important role in shaping the economic consequences of AI.

This result is economically plausible.

AI technologies develop rapidly and create new regulatory challenges concerning data protection, algorithmic accountability, competition, intellectual property, cyber security, and labor-market adjustment. Excessively restrictive regulation may constrain innovation, while regulatory uncertainty may discourage investment. Effective regulation must therefore combine predictability and legal certainty with sufficient flexibility to accommodate technological change.

Government Effectiveness also emerges as an important moderator. Efficient public administration may support the development of digital infrastructure, education and training programs, innovation ecosystems, public-sector digitalization, and technology-related investment. The significance of Rule of Law further indicates that technological transformation depends on strong legal institutions. AI-intensive economic activities require reliable contracts, intellectual-property protection, data governance frameworks, and effective dispute resolution. Control of Corruption also strengthens the AI–growth relationship. Reduced corruption may improve the allocation of digital investment, increase the effectiveness of public procurement, and strengthen investor confidence.

Political Stability produces a smaller but positive moderating effect. Technological investment frequently involves long planning horizons and substantial sunk costs. Stable political conditions therefore reduce uncertainty and support long-term investment decisions. Voice and Accountability does not produce a statistically significant moderating effect in the estimated models.

This does not imply that democratic accountability is economically irrelevant. Rather, its influence on AI-driven growth may operate through indirect mechanisms that are not fully captured by the present specification.

5.1 Implications for European AI Policy

The findings have important implications for European economic and digital policy.

The first implication is that increasing AI adoption alone is unlikely to maximize economic returns. Policies focused exclusively on technological investment, infrastructure, or enterprise adoption may generate limited productivity gains when institutional capacity remains weak. Technological and institutional development should therefore be regarded as complementary components of economic policy.

Second, Regulatory Quality emerges as a particularly important priority. European policymakers should seek regulatory frameworks that protect citizens and markets while maintaining predictability and innovation incentives. Third, strengthening Government Effectiveness may considerably improve the returns to technological investment.

Administrative capacity is essential for implementing digital strategies, coordinating public investment, facilitating technological diffusion, and supporting firms in the adoption of advanced technologies. Fourth, improvements in Rule of Law and Control of Corruption can strengthen the institutional environment in which technology-intensive firms operate. Finally, the results raise an important issue concerning economic convergence within Europe.

Institutionally stronger economies may be better positioned to transform AI adoption into productivity gains. Consequently, technological diffusion could potentially reinforce existing economic differences if institutional capacity varies substantially across countries.

Conversely, institutional reforms may enable less technologically advanced economies to generate larger economic returns from AI adoption.

The policy challenge is therefore not only to increase AI adoption but also to improve the institutional environment within which this technological transformation occurs.

6.0 CONCLUSION

Artificial intelligence has substantial potential to affect productivity, innovation, and economic growth. However, technological potential alone does not determine economic outcomes.

This study develops and empirically evaluates a framework linking **AI adoption, institutional quality, and economic growth** across European economies. Its principal contribution is to conceptualize institutional quality not only as an independent determinant of economic performance but also as a moderator of the AI–growth relationship.

The empirical findings indicate that AI adoption is positively associated with economic growth. However, the economic returns generated by AI differ substantially according to institutional conditions. Among the six Worldwide Governance Indicators, Regulatory Quality emerges as the strongest moderator of the AI–growth relationship, with an interaction coefficient of 0.038.

Government Effectiveness follows with a coefficient of 0.031.

Rule of Law and Control of Corruption also significantly strengthen the growth effects of AI, with coefficients of 0.029 and 0.026 respectively. Political Stability has a smaller positive moderating effect, while Voice and Accountability does not produce a statistically significant interaction. These findings provide support for the concept of **institutional absorptive capacity**.

AI creates technological opportunities, but institutions influence the extent to which these opportunities are transformed into sustainable economic growth.

The central conclusion of the study can therefore be expressed as:

AI Adoption × Institutional Absorptive Capacity → Productivity → Economic Growth

From a policy perspective, European strategies aimed at maximizing the economic benefits of artificial intelligence should combine technological investment with institutional development.

Increasing AI adoption without strengthening regulatory quality, government effectiveness, legal institutions, and transparency may limit the economic returns generated by technological change. The results therefore suggest that institutional reform should not be regarded as separate from technological policy.

Rather, **institutional quality constitutes part of the productive infrastructure required for successful AI-driven economic transformation.**

Several limitations should nevertheless be acknowledged.

First, comparable enterprise-level AI adoption data remain relatively recent, restricting the length of the available panel. Second, AI adoption indicators may not fully capture differences in the intensity, sophistication, or economic importance of the technologies used by individual firms. Third, institutional quality is multidimensional, and additional institutional characteristics may influence technological diffusion.

Future research could therefore incorporate alternative AI indicators, distinguish between specific types of AI technologies, investigate heterogeneous effects across sectors, or examine differences

between advanced and less technologically developed European economies. Further research could also employ nonlinear models, threshold regressions, quantile approaches, or dynamic panel methodologies to determine whether institutional quality becomes particularly important beyond specific levels of AI adoption.

Overall, the findings reinforce the argument that technological progress and institutional development should be considered complementary determinants of long-term economic performance.

The question for policymakers is therefore no longer simply:

“Does artificial intelligence increase economic growth?”

The more important question becomes:

“Under which institutional conditions can artificial intelligence generate the strongest and most sustainable economic growth?”

REFERENCES

- Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of Economic Growth*, 1A, 385–472.
- Acemoglu, D., & Restrepo, P. (2018). Artificial intelligence, automation and work. In *The Economics of Artificial Intelligence: An Agenda*. University of Chicago Press.
- Aghion, P., & Howitt, P. (1992). A model of growth through creative destruction. *Econometrica*, 60(2), 323–351.
- Aghion, P., Jones, B. F., & Jones, C. I. (2019). Artificial intelligence and economic growth. In *The Economics of Artificial Intelligence: An Agenda*. University of Chicago Press.
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58(2), 277–297.
- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29–51.
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143.
- Brynjolfsson, E., Rock, D., & Syverson, C. (2021). The productivity J-curve: How intangibles complement general purpose technologies. *American Economic Journal: Macroeconomics*, 13(1), 333–372.
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press.
- Noy, S., & Zhang, W. (2023). Experimental evidence on the productivity effects of generative artificial intelligence. *Science*, 381(6654), 187–192.
- OECD. (2025). *Governing with Artificial Intelligence*. OECD Publishing.
- Patra, S. K., Dixit, T., & Jangid, K. J. (2026). Impact of artificial intelligence on economic growth: Analyzing the role of governance in shaping outcomes across economies. *Economics of Governance*, 27.

- Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98(5), S71–S102.
- Saba, C. S. (2024). Artificial intelligence and governance interaction in the economic development of BRICS economies. *Research in Globalization*, 8, 100213.
- World Bank. (2025). *Worldwide Governance Indicators*. World Bank.