# New research highlights the impact of AI innovation on European productivity



Recent research conducted by the National Institute of Economic and Social Research has brought to light the significant influence of Artificial Intelligence (AI) innovation on productivity at the firm level within Europe. The study specifically examines the productivity effects of AI innovation across 15 European countries, highlighting a notable correlation between AI advancements and enhanced operational efficiency.

Since the financial crisis of 2008/09, there has been a documented slowdown in productivity across various sectors, further characterised by an expanding productivity gap between top-performing firms and those trailing behind. This disparity has raised questions about the ability of laggard firms to keep up with the technological strides made by their more successful counterparts. The onset of the Fourth Industrial Revolution, propelled by digital technologies and AI, is seen as a catalyst for changes in productive and organisational practices.

The findings of the research indicate that firms that successfully innovate in the AI sector experience productivity increases ranging from 6 per cent to 17 per cent. This analysis is grounded in a difference-in-differences method that contrasts the performance of firms integrating AI with similar ones that have not undertaken such innovations.

In exploring whether firms positioned further from the productivity frontier experience benefits from AI in the same magnitude as leading firms, the study employs a Distance-to-Frontier (DTF) analysis. The research reveals that while leading firms gain substantial advantages from AI implementation, firms further from the frontier can also realise benefits, albeit at a lower scale. Specifically, the direct impact of AI innovation on these laggard firms is estimated to be between 2 per cent and 6 per cent, with more modest indirect effects ranging from 0.3 per cent to 0.7 per cent. The authors assert that by developing AI capabilities, these firms may enhance their operational efficiency, thereby narrowing the productivity gap with market leaders.

In light of their findings, the researchers emphasise the potential of AI to serve not only as a tool for top firms but also as a mechanism for boosting productivity among a broader range of businesses. However, they caution that the full potential of AI could be realised if accompanied by strategic policy measures.

By engaging in a dialog about policy implications, the researchers suggest that targeted initiatives could significantly enhance the adoption and innovation of AI. Key measures might include increased investment in AI research, enhanced access to digital infrastructure, and fostering collaboration between universities and Small and Medium Enterprises (SMEs) in the realm of AI technology. Furthermore, implementing specialized training programs could democratise AI access beyond leading firms, particularly benefitting those further from the productivity frontier.

The study indicates that such policies could facilitate technology transfers from leading enterprises, thereby promoting a more inclusive and widespread uptake of productivity-enhancing technologies across Europe. This perspective is particularly relevant in the context of nations like the UK, which grapple with high numbers of unproductive businesses reticent to embrace advanced technologies.

Overall, the researchers posit that AI has the capacity to function as a General Purpose Technology (GPT), analogous to previous technological revolutions. They argue that both firm-level productivity improvements and broader economic growth in Europe can be achieved through carefully tailored supports for AI. By underpinning a competitive landscape in the digital economy, such initiatives would not only motivate productivity-enhancing developments but also address the prevailing stagnation in European productivity growth. This conclusion is drawn from the research documented in their paper "Productivity performance, distance to frontier and AI innovation: Firm-level evidence from Europe," authored by L.D.S. Marioni, A. Rincon-Aznar, and F. Venturini.

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## Bibliography

1. <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4728017> - This link supports the claim that AI innovation significantly boosts firm productivity in Europe, with productivity increases ranging from 20 to 30% on average, and provides details on the methodology used, including the Difference-in-Differences and Distance-to-Frontier frameworks.
2. <https://portal.research.lu.se/en/publications/productivity-performance-distance-to-frontier-and-ai-innovation-f> - This link corroborates the findings that firms engaging in AI innovation experience productivity increases between 6.2 and 17%, and that firms further from the productivity frontier also benefit, albeit at a lower scale, using a two-fold panel regression analysis and Distance-to-Frontier framework.
3. <https://blog.google/around-the-globe/google-europe/ai-boosting-growth-in-europe/> - This link supports the broader economic impact of AI in Europe, highlighting that AI can add significantly to the EU's GDP and boost competitiveness, aligning with the research's conclusions on AI's potential for economic growth.
4. <https://portal.research.lu.se/en/publications/productivity-performance-distance-to-frontier-and-ai-innovation-f> - This link provides evidence that AI innovation helps firms optimize production tasks and improve resource utilization, leading to higher efficiency and narrowing the productivity gap with market leaders.
5. <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4728017> - This link explains the use of a novel event-analysis methodology within the Difference-in-Differences framework to quantify the effect of AI innovation on firm productivity.
6. <https://www.cer.eu/publications/archive/policy-brief/2023/how-europe-can-make-most-ai> - This link discusses the EU's AI strategy and the need for businesses to adopt AI technology to improve productivity and economic growth, aligning with the research's policy implications.
7. <https://portal.research.lu.se/en/publications/productivity-performance-distance-to-frontier-and-ai-innovation-f> - This link details the indirect effects of AI on firms further from the productivity frontier, estimating benefits between 0.3 and 0.7%, and emphasizes the role of AI in enhancing operational efficiency.
8. <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4728017> - This link highlights the importance of strategic policy measures to enhance AI adoption and innovation, including investment in AI research, access to digital infrastructure, and collaboration between universities and SMEs.
9. <https://www.cer.eu/publications/archive/policy-brief/2023/how-europe-can-make-most-ai> - This link supports the idea that AI can address the prevailing stagnation in European productivity growth by facilitating technology transfers and promoting a more inclusive uptake of productivity-enhancing technologies.
10. <https://blog.google/around-the-globe/google-europe/ai-boosting-growth-in-europe/> - This link underscores the potential of AI to boost European economic growth and competitiveness, particularly in sectors where productivity levels are lower than in the US.
11. <https://portal.research.lu.se/en/publications/productivity-performance-distance-to-frontier-and-ai-innovation-f> - This link confirms the research's conclusion that AI can function as a General Purpose Technology, driving both firm-level productivity improvements and broader economic growth in Europe.
12. <https://news.google.com/rss/articles/CBMiigFBVV95cUxNbFZyRTQ5blVXWnJsdzJkNGhKQU9QOS0wbTN6VE9aZnRfd0t0SmxGZ3l1YTVrd3pvNFR1dkJrQ2VLWFAtVnRnX3E2SWM2TnpRdEpEaUp3Zk5tam1VMTJhc0NaOWlFY21WV19UbFNyZWtVeE8xM0dRNUNBOFNvWVdXWXh6RUtXTVpIc1E?oc=5&hl=en-US&gl=US&ceid=US:en> - Please view link - unable to able to access data