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Digital Infrastructure and Industrial Economic Performance: Evidence from Chinese Provincial Panel Data (2012–2023)

Academic supervisor – [U+62C9][U+6731] [U+7A46][U+7F55][U+9ED8][U+5FB7]

Dong haodi
PhD
Peoples' Friendship University of Russia named after Patrice Lumumba, Экономический факультет, Moscow, Россия
E-mail: 1042248270@rudn.ru

Abstract

In recent years, digital infrastructure has become an increasingly important element of regional development strategies and is widely viewed as a driver of economic modernization. The rapid expansion of broadband networks in China provides a useful setting to examine whether improvements in digital connectivity lead to measurable gains in industrial performance. Despite strong theoretical expectations, existing empirical evidence on this relationship remains inconclusive.

This study explores the link between broadband development and industrial revenue using panel data from 31 Chinese provinces over the period 2013–2022. Industrial performance is measured by the total revenue of large-scale industrial enterprises, while digital infrastructure is proxied by the number of broadband users. To control for unobserved regional heterogeneity and time-specific shocks, a fixed-effects model with both province and year effects is applied. Additional specifications include a lagged broadband variable and an interaction term with regional GDP.

The empirical results indicate that the coefficient on broadband development is positive but statistically insignificant (approximately 0.05 in the baseline specification), suggesting that a 1% increase in broadband users is not associated with a meaningful change in industrial revenue. The lagged effect remains small and negative (around –0.04) and is also statistically insignificant. Similarly, the interaction term between broadband development and GDP does not reach significance. In contrast, GDP shows a consistently positive and statistically significant relationship with industrial revenue, with estimated coefficients ranging from 0.47 to 0.57 across model specifications.

Several factors may explain these findings. First, the economic effects of digital infrastructure are likely to operate through indirect channels, such as technological diffusion and organizational change, which may take time to materialize. Second, improvements in connectivity alone may not be sufficient to stimulate industrial growth without complementary inputs, including human capital and institutional support. Third, digital technologies may primarily enhance efficiency rather than immediately expanding output, limiting their observable impact on revenue in the short term.

Overall, the results suggest that digital infrastructure should be understood as an enabling condition rather than a direct driver of industrial performance. From a policy perspective, this implies that investments in digital infrastructure need to be combined with broader structural measures to generate substantial industrial benefits. Future research may focus on alternative indicators of digital development and explore long-term effects on productivity and industrial transformation.

Источники и литература

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