

# Assessing the environmental impact of fiber optic roll-out in Italian provinces

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In this paper, we explore the impact of digitalization on environmental sustainability, focusing on how Fiber to the Home (FTTH) technology affects air pollution in Italy. The analysis is focused on the link between FTTH diffusion and air quality, specifically PM10 concentrations, across all 107 Italian provinces (NUTS-3 units) from 2017 to 2020. Our study investigates also the spatial implications of Information and Communication Technologies (ICT) at the provincial level, recognizing their significant role. To assess the environmental effects of FTTH technology in Italy we use a well-selected set of control variables that are informed by earlier studies in environmental sustainability. Our analysis method is executed in three stages: firstly, we begin with the Pooled Ordinary Least Squares (POLS) method, then move to a Random Effects (RE) model, and finally conclude with a Spatial Error Model (SEM) that includes random effects, to account for regional spatial effects. Our findings align with existing literature, highlighting the beneficial role of ICT in improving environmental quality. This study contributes to the ongoing discussion about the environmental implications of technological advancement, demonstrating that digitalization can have positive effects on air quality both locally and in surrounding areas.