# Incidencia de la transformación digital en la productividad de las MIPYMES en la ciudad fronteriza de Cúcuta

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## RESUMEN

La transformación digital se ha consolidado como un factor determinante para la competitividad y sostenibilidad de las Micro, Pequeñas y Medianas Empresas (MIPYMES), especialmente en contextos periféricos y fronterizos como la ciudad de Cúcuta. A nivel global, la literatura evidencia que tecnologías como la inteligencia artificial, el análisis de datos, los sistemas de gestión empresarial, la computación en la nube y las plataformas digitales generan incrementos significativos en productividad, eficiencia operativa y rentabilidad. Sin embargo, estos beneficios no se distribuyen de manera equitativa: las MIPYMES enfrentan mayores barreras relacionadas con infraestructura insuficiente, limitaciones de capital humano, desigualdad en el acceso a la conectividad y escasa articulación con el ecosistema de innovación.

En América Latina, las brechas de digitalización siguen siendo profundas. Aunque las MIPYMES representan más del 95% del tejido empresarial regional, su adopción tecnológica continúa siendo básica y fragmentada, prevaleciendo herramientas como correo electrónico, redes sociales y facturación electrónica. El uso de soluciones avanzadas —como CRM, ERP, análisis de datos o comercio electrónico— sigue siendo reducido, lo que impacta la productividad y limita la competitividad frente a grandes empresas digitalmente maduras. Estudios recientes señalan que la falta de infraestructura digital, los altos costos, la baja formación en

competencias digitales y la informalidad empresarial son factores que restringen la apropiación tecnológica, especialmente en territorios vulnerables.

En Colombia, las estadísticas muestran avances en digitalización básica, pero con brechas significativas en el uso de herramientas estratégicas. Solo entre el 21% y el 34% de las microempresas poseen página web; únicamente el 26% del sector comercio vende en línea y apenas el 43% utiliza CRM. En el caso particular de Cúcuta, estas brechas se amplían debido a condiciones estructurales asociadas a su carácter fronterizo: informalidad superior al 59%, baja conectividad, escaso acceso a financiamiento tecnológico, vulnerabilidad frente a la competencia binacional y alta rotación laboral derivada de flujos migratorios.

Los datos locales evidencian un nivel reducido de madurez digital en las MIPYMES cucuteñas. La mayoría se encuentra anclada en tecnologías básicas, mientras que solo un 12% utiliza sistemas de gestión, un 9% implementa comercio electrónico y menos de un tercio invierte en transformación digital. Estas limitaciones repercuten directamente en el desempeño empresarial: la eficiencia productiva es 37% inferior al promedio nacional y predomina un modelo económico basado en manufacturas de bajo valor agregado.

Ante este panorama, la presente investigación analiza la incidencia de la transformación digital en la productividad de las MIPYMES de Cúcuta durante el período 2023-2024. A partir de un enfoque cuantitativo y correlacional, se aplicó un instrumento estructurado con escala Likert para medir tres dimensiones de la transformación digital (infraestructura, capacidades del personal e integración de

tecnologías) y tres dimensiones de productividad (eficiencia operativa, rentabilidad económica e innovación). La validación estadística del instrumento incluyó análisis de fiabilidad, correlaciones y representación gráfica mediante SPSS.

Los resultados permiten caracterizar el nivel de adopción digital en las empresas, identificar los indicadores de productividad y determinar la relación entre ambas variables. La evidencia recolectada sugiere que, aunque existen avances en digitalización básica, la apropiación de tecnologías estratégicas sigue siendo limitada, afectando la productividad global. Las correlaciones obtenidas muestran que las dimensiones de infraestructura tecnológica y capacidades digitales del personal presentan asociaciones significativas con la eficiencia operativa y la rentabilidad, confirmando la importancia del capital humano y los recursos organizacionales como factores habilitadores de la transformación digital.

Este estudio contribuye al campo académico al analizar un territorio fronterizo poco explorado y resalta la necesidad de políticas diferenciadas que aborden las particularidades socioeconómicas de Cúcuta. Asimismo, ofrece evidencia empírica útil para instituciones públicas, empresariales y educativas interesadas en diseñar estrategias efectivas de digitalización orientadas a cerrar brechas y potenciar la productividad de las MIPYMES locales.

**Palabras clave:** Transformación digital; Productividad; MIPYMES; Cúcuta; Innovación tecnológica.

## ABSTRACT

Digital transformation has become a key factor for the competitiveness and sustainability of Micro, Small and Medium Enterprises (MSMEs), particularly in peripheral and border regions such as Cúcuta, Colombia. Although global evidence shows that digital technologies—such as artificial intelligence, cloud computing, data analytics, and enterprise management systems—significantly improve productivity and operational efficiency, their adoption remains uneven in developing contexts. In Latin America, structural barriers such as limited connectivity, low digital skills, financial restrictions, and high informality hinder the effective implementation of digital solutions in MSMEs, which predominantly rely on basic tools such as email, social media, and electronic invoicing.

In Colombia, despite progress in basic digitalization, the use of advanced digital tools remains limited: only 21–34% of microenterprises have a website, 26% engage in online sales, and 43% use CRM systems. These challenges are even more pronounced in Cúcuta, where border dynamics amplify vulnerabilities, including high informality, migration flows, low investment in technology, and insufficient digital infrastructure. As a result, local MSMEs operate with productivity levels significantly below national averages.

This research analyzes the impact of digital transformation on the productivity of MSMEs in Cúcuta during 2023–2024. Using a quantitative correlational approach, a structured Likert-scale instrument was applied to evaluate three dimensions of digital transformation (infrastructure, staff digital skills, and technological integration) and three dimensions of productivity (operational efficiency, economic performance, and innovation). Statistical analyses were conducted using SPSS, including reliability testing and correlation analysis.

Findings reveal that although MSMEs show progress in basic digitalization, the adoption of strategic technologies is still limited, which restricts productivity gains. Significant correlations were identified between technological infrastructure, digital skills, and productivity indicators, confirming that organizational capabilities play a crucial role in leveraging digital transformation. The study contributes to filling a gap in the literature by examining a border region with unique socioeconomic conditions and offers evidence-based insights for designing policies and strategies aimed at strengthening digital adoption and improving MSME productivity in Cúcuta.

**Keywords**: Digital transformation; Productivity; MSMEs; Border regions; Innovation.

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