

THE ROLE OF SMARTIZATION IN SHAPING THE COMPETITIVENESS OF SMES

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Abstract: *The article explores the role of smartization in shaping the competitiveness of small and medium-sized enterprises and presents key impacts, challenges, and strategic approaches to enhance their efficiency, market positioning, and long-term sustainability.*

Key words: competitiveness, smartization, small and medium-sized enterprises (SMEs).

Smartization plays a crucial role in enhancing the competitiveness of small and medium-sized enterprises (SMEs) by driving efficiency, innovation, and market expansion [1]. The integration of smart digital technologies into business processes allows SMEs to improve productivity, reduce costs, and respond to market changes more effectively [2; 3]. The impact of smartization can be analyzed across four key dimensions: economic, technological, market, and organizational.

The impact of smartization on SME competitiveness can be analyzed through four key dimensions: economic, technological, market, and organizational. These dimensions influence various aspects of business performance, from cost reduction and process automation to market expansion and digital transformation. However, SMEs also face significant barriers, including financial constraints, technological limitations, human capital challenges, and regulatory compliance issues, which may slow down the adoption of smart technologies. Fig. 1 illustrates the relationship between smartization, its core impacts, and the barriers affecting SME competitiveness.

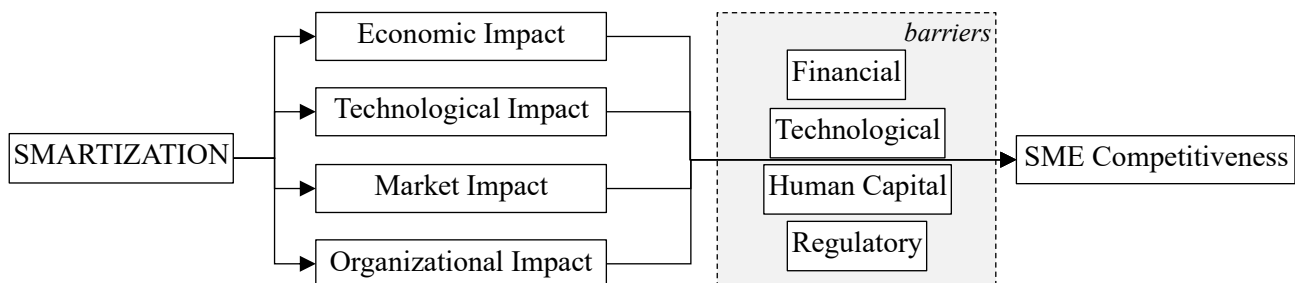


Fig. 1. The Impact of Smartization on SME Competitiveness (source: developed by the author based on [2; 3])

Smartization plays a crucial role in enhancing the economic efficiency of SMEs by reducing operational costs through automation, process optimization, and data-driven decision-making. Businesses can improve efficiency by utilizing AI-powered analytics, predictive maintenance, and digital supply chain management, which streamline workflows, minimize resource waste, and enhance production planning. Moreover, smartization fosters the development of new business models, such as digital marketplaces, subscription-based services, and data-driven solutions, enabling SMEs to diversify revenue streams and remain competitive in an evolving market. Alongside economic advantages, technological progress driven by smartization significantly enhances SME performance by integrating artificial intelligence, the Internet of Things, cloud computing, and automation technologies. AI-powered analytics provide real-time insights into customer behavior and operational efficiency, while IoT solutions improve resource tracking and supply chain logistics. Cloud computing facilitates cost-effective data storage and accessibility, allowing businesses to scale operations efficiently, and automation reduces human error while optimizing workforce allocation.

Beyond technological improvements, smartization enables SMEs to expand into new markets by leveraging digital platforms, e-commerce, and targeted marketing strategies. AI-driven customer insights help businesses create personalized experiences, increasing customer retention and brand engagement. The use of smart customer relationship management systems and automated chatbots enhances real-time customer service, contributing to better market positioning. Moreover, digital transformation allows SMEs to develop customized and on-demand services, strengthening their ability to adapt to consumer preferences and industry shifts. At the organizational level, smartization encourages more agile management structures, enabling businesses to make data-driven decisions and adapt quickly to changing market conditions. Digital collaboration tools support remote work, allowing SMEs to optimize workforce distribution and attract global talent. Additionally, automation relieves employees of repetitive tasks, fostering a culture of innovation where teams can focus on strategic development. A digitally transformed SME also benefits from continuous knowledge sharing and employee upskilling, ensuring long-term adaptability to technological advancements.

Despite its benefits, the implementation of smartization in SMEs is often hindered by several barriers:

1. *Financial barriers.* One of the primary challenges for SMEs is the high cost of digital transformation. Implementing smart technologies requires significant upfront investments, which many small businesses struggle to afford. Additionally, limited access to financial support and low investor confidence in digital projects restrict SMEs from adopting new technologies.

2. *Technological barriers.* Many SMEs face limited access to smart technologies due to infrastructure constraints and lack of technical expertise. The integration of new digital tools with existing legacy systems often presents compatibility issues, further complicating the transition process. Moreover, cybersecurity threats and concerns over data protection add additional layers of complexity to digital adoption.

3. *Human capital barriers.* A significant obstacle to smartization is the lack of digital skills and expertise among employees and management. SMEs often struggle to find and retain tech-savvy professionals who can drive digital transformation initiatives. Additionally, resistance to change among employees slows down the adoption of smart technologies, as many workers fear job displacement due to automation.

4. *Regulatory barriers.* Strict compliance with data protection regulations (e.g., GDPR) and cybersecurity laws presents another major challenge for SMEs. Many small businesses lack the legal expertise required to navigate complex regulations, exposing them to potential penalties and data security risks. Additionally, bureaucratic procedures and slow policy adaptation may limit access to government incentives for digital transformation.

Understanding these key impacts and challenges allows SMEs to develop targeted strategies to maximize the benefits of smartization while mitigating its associated risks. Future research should focus on creating supportive digital transformation frameworks, improving access to financial assistance programs, and strengthening digital skill-building initiatives to accelerate the adoption of smart technologies across the SME sector. By overcoming these barriers, SMEs can fully leverage smartization to enhance their competitiveness, drive sustainable growth, and position themselves as key players in the digital economy.

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