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How competitive pressures and technological innovations shape organizational practices: Insights from the European manufacturing survey

Ciric Lalic, D.[a,*], **Delic, M.**[b], **Lalic, B.**[c], **Todorovic, T.**[d], **Savkovic, M.**[e]

[a,b,c,d,e]Faculty of Technical Sciences, University of Novi Sad, Novi Sad, Serbia

ABSTRACT

This study investigates the relationship between competitive pressures, technological adoption, and organizational dynamics in the manufacturing sector, with a focus on Serbian firms. Using data from the European Manufacturing Survey (EMS) of 146 manufacturing firms, Structural Equation Modeling (SEM) was employed to analyze the influence of competitive factors on the adoption of advanced manufacturing technologies, including Production Control Systems, Automation and Robotics, Efficiency Technologies, and Additive Manufacturing and Simulation Tools. The findings highlight the pivotal role of Production Control Systems in enhancing operational efficiency and strategic decision-making, demonstrating a significant positive effect on both the Organization of Production ($\beta = 0.384$, $p = 0.001$) and Production Management/Controlling ($\beta = 0.500$, $p < 0.001$). In contrast, other technologies did not show statistically significant effects, indicating more selective adoption patterns. Barriers such as financial constraints, technical complexity, and limited organizational readiness were found to restrict broader integration of automation, efficiency, and additive technologies. These results underscore that firms tend to prioritize technologies that offer immediate and auditable operational benefits. Practical implications include the need for workforce upskilling programs, managerial training in digital transformation, innovation hubs for lower-risk piloting, and supportive policy frameworks (e.g., financial incentives, regulatory sandboxes). Collectively, these measures can strengthen absorptive capacity, reduce resistance to change, and foster resilience, sustainability, and competitiveness through targeted technological integration and organizational alignment.

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**Corresponding author:*
danijela.ciric@uns.ac.rs
(Ciric Lalic, D.)

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Izvirni znanstveni članek

Vpliv konkurenčnih pritiskov in tehnoloških inovacij na organizacijske prakse: spoznanja iz Evropske raziskave proizvodnje

Ciric Lalic, D.[a,*], **Delic, M.**[b], **Lalic, B.**[c], **Todorovic, T.**[d], **Savkovic, M.**[e]

[a,b,c,d,e]Faculty of Technical Sciences, University of Novi Sad, Novi Sad, Serbia

POVZETEK

Raziskava preučuje razmerje med konkurenčnimi pritiski, uvajanjem tehnologij in organizacijskimi dinamikami v proizvodnem sektorju, s poudarkom na podjetjih v Srbiji. Na podlagi podatkov Evropske raziskave proizvodnje (European Manufacturing Survey, EMS), ki zajema 146 proizvodnih podjetij, je bila za analizo vpliva konkurenčnih dejavnikov na uvajanje naprednih proizvodnih tehnologij uporabljena metoda modeliranja strukturnih enačb (Structural Equation Modeling, SEM). Obravnavane tehnologije vključujejo sisteme za vodenje proizvodnje, avtomatizacijo, robotiko, tehnologije učinkovitosti, dodajalne tehnologije in simulacijska orodja. Rezultati izpostavljajo ključno vlogo sistemov za vodenje proizvodnje pri izboljševanju operativne učinkovitosti in strateškega odločanja, saj ti sistemi izkazujejo statistično značilen pozitiven vpliv tako na organizacijo proizvodnje (β = 0,384; p = 0,001) kot na vodenje in nadzor proizvodnje (β = 0,500; p < 0,001). Druge tehnologije niso pokazale statistično značilnih učinkov, kar kaže na bolj selektivne vzorce njihovega uvajanja. Širšo integracijo avtomatizacije, tehnologij učinkovitosti in dodajalnih tehnologij omejujejo ovire, kot so finančne omejitve, tehnična zahtevnost in omejena organizacijska pripravljenost. Rezultati poudarjajo, da podjetja dajejo prednost tehnologijam, ki zagotavljajo takojšnje in preverljive koristi. Praktične implikacije vključujejo potrebo po programih nadgradnje znanj zaposlenih, managerskem usposabljanju na področju digitalne preobrazbe, vzpostavitvi inovacijskih vozlišč za pilotno uvajanje z nižjim tveganjem ter podpornih politikah, kot so finančne spodbude in regulativni peskovniki. Ti ukrepi krepijo absorpcijsko sposobnost organizacij, zmanjšujejo odpor do sprememb ter prispevajo k večji odpornosti, trajnosti in konkurenčnosti s ciljno usmerjeno tehnološko integracijo in organizacijsko uskladitvijo.

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Ključne besede:
Konkurenčni pritiski;
Napredne proizvodne tehnologije;
Sistemi za vodenje proizvodnje;
Tehnologije učinkovitosti;
Dodajalne tehnologije;
Modeliranje strukturnih enačb (SEM);
Evropska raziskava proizvodnje (EMS);
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**Kontaktna oseba:*
danijela.ciric@uns.ac.rs
(Ciric Lalic, D.)

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