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## **IMPACT OF COVID-19 ON ALBANIAN MANUFACTURING FIRMS: AUTOMATIZATION AS A RESILIENCE STRATEGY**

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### **Abstract**

*The COVID-19 pandemic has determined a significant change in the global business landscape, influencing firms to reassess and reconfigure their operations. This study focuses into the specific challenges faced by manufacturing firms originating from low-cost countries during COVID-19 pandemic, with a particular focus on the importance of automatization in overcoming these barriers. The study centers on Albanian manufacturing firms, aiming to provide valuable insights into the complex dynamics in the context of a developing economy. The methodology used in this research comprises a thorough literature review, synthesizing existing studies and scholarly articles to distinguish patterns, trends, and best practices relevant to the impact of COVID-19 on manufacturing operations and the role of automatization in mitigating challenges. The comprehensive review serves as the foundation for the analysis of the unique circumstances faced by manufacturing enterprises in low-cost countries, with specific focus of Albania context. The findings of this study show the multifaceted challenges faced by manufacturing firms in low-cost countries, particularly those originated from Albania, as they cope with the effects of the global health crisis. Issues such as supply chain disruptions, labor shortages, and heightened uncertainty are identified as critical obstacles. Moreover, the study finds the urgency of embracing technological advancements, particularly in the form of automatization, as a strategic imperative for sustainable and adaptive business models. Finally,*



*it highlights the transformative potential of automatization in streamlining processes, ensuring business continuity, and enhancing overall resilience in the face of disruptions. By focusing on Albanian manufacturing firms, this research contributes a unique perspective to the broader discourse on the impact of COVID-19 on business operations.*

*Keywords: COVID-19, Automatization, Albania, Manufacturing firms, Low-cost country, Supply chain*

## **INTRODUCTION**

This study focuses on the exploration of the relationship between the global COVID-19 pandemic, the operational dynamics of manufacturing firms, and the transformative potential of automation. It starts by providing a panoramic overview of the impact of the pandemic on worldwide business operations, setting the point for a detailed examination of its implications on manufacturing enterprises.

In this context, this study shows a specific focus on manufacturing firms situated in low-cost countries, with a specific attention on the unique challenges faced by Albanian enterprises. Situated in the heart of Europe, Albania's manufacturing sector has been in the center of attention of the global economic changes caused by the pandemic (Countries & Taxation, 2018; Icka et al., 2021; Republic of Albania. Council of Ministers, 2022; The World Bank, 2021). This study offers an investigation regarding the resilience and adaptability of Albanian manufacturing firms, providing insights on their ability to experience economic challenges historically.

The research objective is to analyze the challenges that these Albanian manufacturing firms have faced due to COVID-19. This objective is linked with an exploration of the main role that automation, encompassing both digitization and mechanization, plays in mitigating these challenges. This study thus serves a panorama of pandemic-induced disruptions and the potential avenues for overcoming them.

Furthermore, the significance of this research lies not only in its contextual focus on Albanian manufacturing but also in its broader implications for understanding how manufacturing firms in low-cost countries globally are reshaping their strategies in response to the unprecedented disruptions triggered by the pandemic. In particular, this study investigates the dynamics of COVID-19's impact on manufacturing operations, underscoring the urgency of technological adaptation for resilience.

This research investigates the challenges faced by Albanian manufacturing firms due to COVID-19 and explores the role of automatization in overcoming these challenges. The study

utilizes a literature review methodology to analyze the unique circumstances of manufacturing enterprises in low-cost countries, focusing on the Albanian context.

The findings offer practical insights for policymakers, industry stakeholders, and business leaders seeking to fortify the resilience of manufacturing enterprises in low-cost countries against future disruptions (Impola, 2023; Kwon, 2020; Strange, 2020). Moreover, the study underscores the urgency of embracing technological advancements, particularly in the form of automatization, as a strategic imperative for sustainable and adaptive business models (Lee et al., 2023; Lopes et al., 2022; Molinaro et al., 2022).

Finally, this research not only addresses the immediate challenges faced by manufacturing firms in low-cost countries in the aftermath of COVID-19 but also advocates for a proactive approach in leveraging technological solutions to build resilience for the future. This study is articulated as follows. It starts with a literature review highlighting key findings on challenges faced by manufacturing firms in low-cost countries, accentuating weaknesses and disruptions in their operations. The second section focuses on the methodology providing a detailed explanation of the literature review approach adopted for this study. It is followed by the third section focused on some findings on challenges faced by Albanian manufacturing firms and the importance of automatization in overcoming challenges. Finally, this study ends with some conclusion highlighting the significance of the research in informing strategic decision-making and contributing to the broader discourse on the intersection of global crises, manufacturing, and technological innovation.

## LITERATURE REVIEW

### Overview of existing literature on the effects of COVID-19 on manufacturing operations

Recent literature show that pandemic has determined a reconfiguration of traditional manufacturing models analyzing the impact on production, supply chains, and overall operational resilience (Giammetti et al., 2020; Impola, 2023; Kwon, 2020; Molinaro et al., 2022; Strange, 2020). Moreover, it provides insights on manufacturing facilities facing with workforce disruptions due to health and safety concerns, leading to unprecedented production break off and delays (Impola, 2023; Strange, 2020).

Supply chain dynamics emerge as a central theme in the literature, with an emphasis on how the pandemic-induced disruptions have reconfigured the global supply networks. The weaknesses of just-in-time inventory systems, often known for their efficiency, has been scrutinized in the wake of production delays caused by shortages in raw materials and components (Molinaro et al., 2022). These disruptions are followed by the manufacturing

ecosystem, influencing decision-making, risk assessment, and the reevaluation of supply chain strategies (Kwon, 2020; Lopes et al., 2022; Strange, 2020).

Moreover, the literature underlines the effects of the pandemic across various manufacturing sub-sectors. In particular, studies provide insights on the impact on automotive, electronics, pharmaceuticals, and other key industries, explaining sector-specific challenges that demand tailored solutions (Bettiol et al., 2020a, 2021; Maisiri et al., 2019; Majumdar et al., 2021; Szalavetz, 2018). From unprecedented fluctuations in demand to shortages in critical components, the literature paints a vivid picture of an industry navigating uncharted waters.

The resilience of manufacturing operations emerges as a central theme in the literature, confirming that the ability to adapt and innovate is integral to survival. Scholars are increasingly exploring how firms are reconfiguring their strategies, embracing digital technologies, and redefining their production paradigms to emerge stronger from the pandemic's disruptive effects (Agostini & Filippini, 2019; Bettiol et al., 2022; Demirkesen & Tezel, 2022).

This study provides not only an overview of the current state of knowledge but also an exploration of challenges specific to manufacturing firms in low-cost countries, with a focal point on Albanian firms.

Low-cost countries often attract manufacturing firms due to the availability of cost-effective labor (Canham & Hamilton, 2013; Larsen et al., 2013; "Transforming Capabilities in Offshoring Processes: Longitudinal Development of Organisational Resources and Routines in Four Danish Offshoring Enterprises," 2015; Virtualuoto et al., 2016). However, the pandemic has underscored the risks associated with labor-intensive operations, particularly when faced with health and safety concerns (Neumann & Dul, 2010; The World Economic Forum, 2020). Workforce disruptions, lockdowns, and severe health protocols, have significantly impacted the continuity of operations (Lee et al., 2023; Nair, 2022; Neumann & Dul, 2010; Salam & Bajaba, 2023; The World Economic Forum, 2020).

Automatization is not just about machines, it also involves the integration of human capital with advanced technologies meaning that the adoption of automated technologies necessitates a shift in workforce skills (Bettiol et al., 2017, 2020b, 2021; Grzybowska & Łupicka, 2017; Maisiri et al., 2019; Majumdar et al., 2021). Training programs and upskilling initiatives become important for ensuring that the workforce can adeptly operate, maintain, and innovate within an automated ecosystem.

## METHODOLOGY

The methodology used in this study is focused on a literature, given its effectiveness in synthesizing existing knowledge and providing a robust foundation for analysis. Literature

review methodology involves an accurate selection process, ensuring that the chosen sources are not only relevant to the overarching theme of the impact of COVID-19 on manufacturing operations but also specific to the challenges faced by low-cost countries, with a particular focus on Albanian manufacturing firms.

The reason on focusing only on Albania is justified by the country's distinctive economic and geographic characteristics, making it a representative case study for understanding the challenges and opportunities that manufacturing firms in low-cost countries encounter among global disruptions (Blau & Janssen, 2020; Countries & Taxation, 2018; Filipi & Balla, 2011; Open Society Foundation for Albania – Soros Foundation, 2010; Republic of Albania. Council of Ministers, 2022). By building on the use of a variety of sources, the methodology strengthens the research's credibility and positions it to contribute meaningfully to the existing body of knowledge on the subject.

## RESULTS

### Challenges faced by Albanian manufacturing firms

Albanian manufacturing firms, deeply rooted in global supply chains, encounter strong challenges as the pandemic disrupts the flow of goods and services across borders. The results show the implications of global supply chain disruptions on production schedules, inventory management, and the overall operational agility of Albanian manufacturing firms (Erlangen-Nürnberg zur et al., 2022; Kwon, 2020; Salam & Bajaba, 2023; Vardari et al., 2022).

Other important finding is linked to the pandemic's impact on workforce availability. The unique challenges of maintaining a productive and healthy workforce are scrutinized, considering factors such as health concerns, government-imposed lockdowns, and the need for stringent health protocols (Khawaja et al., 2022; Lee et al., 2023; Mota et al., 2022; Nair, 2022; Neumann & Dul, 2010; Osland et al., 2020; The World Economic Forum, 2020). An important consideration are the measures taken by firms to address workforce challenges, including remote work initiatives, safety protocols, and strategies for maintaining employee morale amid uncertainties (Neumann & Dul, 2010; The World Economic Forum, 2020).

The economic landscape of Albania, marked by its emerging status, faces increased uncertainty due to the pandemic such as financial strains experienced by Albanian manufacturing firms (Blau & Janssen, 2020; International Labour Organization, 2023; Republic of Albania. Council of Ministers, 2022). Currency fluctuations, increased operational costs, and potential disruptions in credit markets are dissected to understand their collective impact on the financial resilience of these firms (Impola, 2023; Kwon, 2020; Strange, 2020).

Other important finding is the importance of digital transformation and automation such as the firms are embracing technological advancements, the challenges faced in upskilling the workforce to adapt to digital tools, and the strategic initiatives undertaken to bridge the technological gap (Mubarak & Petraite, 2020; Naeem & Di Maria, 2020; Oliveira & Turčínková, 2019).

The geopolitical and regulatory environment of Albania emerges as an important factor influencing the ability of manufacturing firms to face challenges. Findings show that trade policies, government regulations, and support measures impact on the strategies adopted by Albanian manufacturers (Blau & Janssen, 2020; Icka et al., 2021; Republic of Albania. Council of Ministers, 2022; The World Bank, 2021).

### **Importance of automatization in overcoming challenges**

As Albanian manufacturing firms cope with the complex challenges caused by the COVID-19 pandemic, the strategic importance of automatization becomes an important point for facing disruptions and building resilience. Findings show that the adoption of automation, encompassing both digitization and mechanization, emerges as an important strategy for overcoming the challenges posed by supply chain disruptions, labor shortages, and heightened uncertainty. Automated supply chain management not only enhances visibility into the entire supply chain but also facilitates dynamic adjustments, ensuring that the impact of disruptions is minimized (Di Maria et al., 2022; Erlangen-Nürnberg zur et al., 2022; Kwon, 2020; Majumdar et al., 2020)

Automation is positioned as a strategic response to labor shortages, offering a transformative solution to maintain operational continuity. Findings show that the integration of robotic systems, smart manufacturing technologies, and other automated processes enhances efficiency and reduces dependency on human labor (Bettioli et al., 2022; Mian et al., 2020; Naeem & Di Maria, 2020). Moreover, it results that Albanian manufacturing firms can mitigate the challenges posed by labor shortages through the application of automated technologies. Automated systems equipped with advanced analytics and machine learning algorithms enable data-driven decision-making, ensuring that Albanian manufacturing firms can swiftly adapt to dynamic market conditions. This means that automated technologies become strategic assets in fortifying the adaptive capacity and operational efficiency of manufacturing firms operating through uncertain times.

Automation is not only about replacing human labor; it involves strategic workforce development to ensure synergy between technology and human capital. By exploring training programs, skill development initiatives, and collaborative human-technology workflows,

automation becomes an enabler for workforce empowerment rather than a threat to employment.

## CONCLUSION

This study analysis the challenges faced by Albanian manufacturing firms, highlighting the impact of supply chain disruptions, labor shortages, and increased uncertainty on their operations. Simultaneously, it underlines the transformative potential of automatization in mitigating these challenges and enhancing overall resilience.

Building upon the identified challenges and the role of automatization, this study emphasizes the urgency for proactive measures, urging Albanian manufacturing firms to embrace technological advancements and integrate automated solutions into their operational frameworks. Moreover, it underlines the critical importance of strategic decision-making and fostering a culture of innovation within Albanian manufacturing firms. As the global business landscape continues to evolve, the ability to adapt and innovate becomes important for sustained growth and competitiveness. By embracing automated technologies and cultivating an innovative mindset, these firms can position themselves not only to overcome current challenges but also to thrive in a future characterized by dynamic disruptions.

The findings highlight the broader significance of the study in contributing to the discourse on the intersection of global crises, manufacturing, and technological innovation. They emphasize how the lessons drawn from the challenges faced by Albanian manufacturing firms during the COVID-19 pandemic can inform strategic decision-making and contribute to the ongoing global conversation on building resilient and adaptive business models.

This section synthesizes the research findings into practical insights, offering implications and recommendations that are important for policymakers, industry stakeholders, and the leadership of Albanian manufacturing firms. It serves as a roadmap for strategic decision-making and outlines actionable steps to enhance the resilience of these firms in the consequence of the COVID-19 pandemic.

For policymakers, this study underlines the importance of creating an enabling environment that encourages the adoption of automated technologies in the manufacturing sector. Incentives, regulatory frameworks, and supportive policies can play a crucial role in facilitating the integration of automation, ensuring that Albanian manufacturing firms are well-positioned to navigate future disruptions. Additionally, targeted initiatives for workforce upskilling and technological readiness can contribute to a more sustainable and competitive manufacturing landscape.

Industry stakeholders and business leaders are encouraged to invest in and prioritize the integration of automated technologies within their manufacturing processes. This study suggests that a proactive approach to automation can not only enhance operational resilience but also position Albanian manufacturing firms as leaders in efficiency and innovation. Collaborative efforts within the industry, such as knowledge-sharing platforms and consortiums, can further amplify the positive impact of automation and foster a culture of continuous improvement.

The recommendations for Albanian manufacturing firms rotate around the strategic incorporation of automated technologies into their operational frameworks. Moreover, this study suggests a comprehensive assessment of existing processes to identify areas where automation can produce the greatest benefits. It also encourages investment in employee training programs to ensure a smooth transition to automated systems. Furthermore, fostering a culture of innovation and adaptability is emphasized, as it will be pivotal for the long-term sustainability and growth of these firms in a rapidly evolving global landscape.

Findings also highlight the importance of collaboration and knowledge exchange among policymakers, industry stakeholders, and manufacturing firms. By fostering a collaborative ecosystem, the entire manufacturing sector in Albania can collectively address challenges, share best practices, and accelerate the adoption of technologies that enhance overall resilience.

Concluding, the implications and recommendations provided in this study are designed to guide key stakeholders in catalyzing positive change within the Albanian manufacturing landscape. The collaborative implementation of these recommendations has the potential to not only address the challenges posed by the COVID-19 pandemic but also lay the foundation for a robust, technologically advanced, and adaptive manufacturing sector in Albania.

This study offers some limitation. First, this study focuses on Albanian manufacturing firms, which may limit the generalizability of findings to other geographic locations or industries. Factors unique to the Albanian context may not be fully representative of challenges faced by manufacturing firms in different regions. Second, the research relies on a literature review methodology, which may introduce biases based on the selected sources. Additionally, the absence of primary data collection, such as interviews or surveys with Albanian manufacturing firms, might limit the depth of insights into specific challenges faced by these firms. Third, the COVID-19 pandemic is an evolving global crisis, and the dynamics of its impact on businesses are subject to change. The research captures a snapshot of challenges and strategies within a specific timeframe, but the fluid nature of the pandemic may lead to shifts in the business environment over time. Fourth, this study focuses on manufacturing firms, potentially



overlooking challenges faced by businesses in other sectors. Service industries, for example, may have distinct challenges that are not fully addressed in this study.

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