DIGITAL AUTOMATION AND LABOUR MARKET RESTRUCTURING IN POST-COVID-19 ALBANIA

Lisian Roseni [1] **, *Reis Mulita*** [2]

1 University of Tirana, Faculty of Social Sciences, Department of Political Science, Albania
2 Canadian Institute of Technology. Faculty of Economy, CIRD Economy, Albania

Abstract

The post-COVID-19 pandemic has led to an accelerated pace of digitalization which has transformed the Albanian labour market structurally. This paper analyses the influence of digital transformation and process automation upon employment volume, type of jobs, and required skills, within Albanian private enterprises. Primary research was conducted through a survey of 110 businesses in 12 different economic sectors in 2025. Secondary research was drawn from international bodies including the International Labour Organization, INSTAT, World Bank, and Eurostat. A Digi Score Index, Likert-Scale analysis, Independent Samples T-test, and Pearson correlation were used as methods to assess the influence of digitalization on Albanian labor markets. The study found that new firms created after the onset of the pandemic have shown higher levels of Digital Readiness (Digi Score 64.5% vs. 53.8%). Additionally, there is a marked growth in the demand for employees possessing digitally-based skills; this has been accompanied by a 325% relative increase in the use of flexible employment contracts. Furthermore, it has been observed that six major digital professions categories are missing from Albania's Official National List of Professions, thus creating gaps in regulation and statistics that affect the ability of policymakers to develop accurate policies. The results indicate that digital automation is contributing to the polarization of the labour market based upon education and skill levels, in accordance with theoretical notions related to skill-biased technological change. Finally, the paper includes recommendations aimed at both policymakers, higher education institutions, and business stakeholders.

Keywords: Digital Transformation, Labour Market, Employment, Digital Divide, Post-Covid-19

1. INTRODUCTION

The Fourth Industrial Revolution has dramatically changed labor markets around the globe by increasing automation and dislocating workers who were employed in routine jobs as well as creating entirely new job categories whose professional development can be difficult for existing institutional arrangements to accommodate (Schumpeter, 1942: 81 - 86; Autor et al., 1998: 1170). COVID-19 accelerated the incremental digitalization of the labour market. As a result, organizations all over the world rapidly adopted remote work, cloud-based services, and digitalized their entire supply chain (George et al., 2020: 1754 - 1756). Albania was no exception, while COVID-19 highlighted the lack of preparedness of the digital readiness of Albania's labor market, it also triggered an irreversible shift in structure in terms of the future of employment. Previous research published in the ICITTBT 2023 proceedings (Roseni, 2023) mapped out the general dimensions of Albania's transformative changes in the digital labor market, employing mainly a scenario planning approach and secondary information. That previous research found a developing skills deficit, emerging policy initiatives, and the absence of detailed data on newly evolving digital professions. This paper makes significant progress beyond this research agenda: it presents original data from a structured survey of 110 Albanian companies; uses statistical methods to test formally hypothesized relationships between variables; and finds an important institutional failure, the non-classification of digital professions, which has previously gone without empirical analysis in the context of Albania. What are the questions that underlie this research? The central research question is: How has digital transformation, defined operationally through process automation, ICT adoptions and new ways of working, reshaped the Albanian labor market since the pandemic?

2. LITERATURE REVIEW

The research is guided by two theoretical approaches, each one relating to digitalization. Firstly, according to Schumpeter's (1942: 81-86), the process of "creative destruction" implies that technological innovations will systematically displace existing producers and reallocate labor towards the development of new activities with greater potential for growth. Regarding digitalization in Albania, the ICT-intensive sector has grown from 2.32 percent of all active businesses

*Corresponding author: Lisian Roseni, lisian.roseni@unitir.edu.al

in 2014 to 4.13 percent in 2023 (INSTAT, 2024); conversely, the share of businesses operating in primary sectors has declined. Secondly, based on the skill-biased technological change (SBTC) model proposed by Autor et al. (1998: 1170), information technologies create disproportionate advantages for highly skilled workers, widen pay disparities and cause an increased division of occupations into high-skilled/ high-paid occupations and low-skilled / low paid occupation segments. Therefore, the SBTC model can explain the educational stratification discovered through the DigiScore analysis.

Digital human capital was identified by Ognjanović et al. (2024) to be one of the most important factors influencing how well an enterprise performs in terms of output per worker across all western balkans. Blažič and Blažič (2020), identified the importance of digital readiness to enable the effective adoption of productive automation within transitional economies. According to the ILO (2023: 8), ICT workers have been recorded as being some of the fastest growing occupations in the region. However, a major obstacle facing these workers is a lack of formal professional classification and therefore limited institutional recognition and legal protection (Eurofound, 2020; De Stefano, 2016). multilingual corpora (Amel Muminovic, 2025).

3. METHODOLOGY

In this paper, we use a combination of both quantitative and qualitative methodologies. Quantitative data has been collected from our own survey, which consisted of a questionnaire that was distributed to private businesses in Albania (approx. 120,000) in 2025. The sampling method used was purposeful, where the 110 businesses selected had a range of sizes. The number of businesses sampled was limited due to resources. There is also an assumption made in the paper that large companies (> 250 employees) and medium-sized companies (50 - 249 employees) will have greater access to digital technologies than small companies (< 50 employees). This is based on the findings of Eurostat (2022), which stated that these two groups account for 82% of all digital investments in Albania and provide 78% of formal employment. There were 110 responses to our survey. Respondents included general managers (61.8 %), marketing specialists (20.9%), HR specialists (5.5%), and finance or IT specialists (8.2%). We assume that respondents provided accurate information regarding their organisation's digital capabilities. The Digital Readiness Score (DigiScore) is a composite measure of four factors including:

1. Technology Infrastructure
2. Process Automation
3. Staff Digital Competences
4. Digital Service Provision

These four components of DigiScore consist of 45 individual questions that are scored on a five point likert scale ranging from "does not apply" (score of 0) through to "fully agree" (score of 5). The scores are then combined to produce an overall percentage score out of 100%. We compared the means of the DigiScore scores for companies established prior to COVID-19 (n=61) and those established since the start of the pandemic (n=46) using independent-samples t tests. A Pearson correlation coefficient was used to examine if there was a linear association between the educational attainment levels of the workforce and DigiScore. Finally, we conducted a regulatory gap analysis by comparing the lists of professions contained in the National List of Professions 2009, the revised list of 2017, and Council of Ministers Decision No. 753/2023.

4. DATA ANALYSIS

4.1 Digital Readiness: The COVID-19 Dividing Lin

The DigiScore Index indicates that there was a significant digital preparedness divide between businesses prior to the pandemic and those that were formed in response to the pandemic. Businesses that were created prior to COVID-19 had a DigiScore of 53.8%, on average, compared to the average DigiScore of 64.5% for companies developed in response to COVID-19; a difference of 10.7 percentage points. As such, the pandemic has been confirmed as being a structural accelerant rather than merely a one-time impact, as stated by George et al., (2020: 1754-1756).

As it relates to organizational predictors of digital capacity, the educational level of an organization's workforce is the strongest predictor of its ability to adopt technology. There is a negative Pearson correlation between the number of workers having primary/secondary education levels and the DigiScore of $r=-.544$ ($p<.001$) whereas the number of employees holding a bachelors/master's degree is positively correlated with DigiScore at $r=+.528$ ($p<.001$). Furthermore, with 56.9% of all employees across the surveyed organizations possessing no higher than primary/secondary level education, the potential for structural barriers to be present in regards to widespread digital adoption is sizeable. These Pearson correlations empirically support the skill-bias technological change model as described by Autor et al., (1998: 1170), within the Albanian context.

Secondary data also supports this image. Between 2019 and 2023, the percentage of enterprises employing ten or more employees that employed at least one ICT specialist increased from 23.4% to 28.4%. Additionally, between 2019 and 2023, the percentage of employees utilizing computers to perform their job duties increased from 26.8% to 29.9% (INSTAT,

2023: 1-2). Lastly, the wage growth experienced by individuals employed in the ICT industry between 2014 and 2023 averaged approximately 14% per annum compared to the average wage growth experienced by the overall economy of approximately 5.7% per annum (INSTAT, 2024). These figures suggest strong demand for skilled workers capable of adopting digital technologies, as well as increasing labor market polarization.

4.2 Employment Volume, Forms, and Automation Demand

Although there has been rapid development in digitalization, the vast majority of full-time jobs remain in place (91.9%) as found in ILO's (2023) research regarding the low rate at which gig economy workers occupy positions in most countries of the Balkans. As part-time employees make up approximately 6.2% of the total workforce of the sampled companies, freelance/short-term contractual employee arrangements comprise about 1.9% of the entire workforce.

There is a noticeable directional trend in the aggregate data provided. For instance, among firms established prior to COVID-19, less than 1% (0.8%) of their employees were employed via flexible agreements (freelance/short term); whereas for firms created either during or after the pandemic, this number increased to nearly 10% (3.4%) - a relative growth rate of 325%.

This directional difference approached statistical significance ($p = .054$), indicating a new form of organizational structure may be developing rather than being due to random chance. This finding was also noted and reported more extensively by Eurofound (2020).

The Likert scale measures indicate a significant gap in attitudes between the two groups of firms regarding the use of digital technologies in recruiting and managing staff (see Table 1). Companies developed post-COVID-19 scored significantly greater on each of the three subscales related to how digital technology impacted their recruitment and HR policies. On average the composite subindex "Digitalization Impact" scores $M=3.63$ ($SD=1.48$) for post-Covid companies, compared to $M=2.38$ ($SD=1.62$) for pre-Covid companies, $t(105)=-4.16$, $p<.001$. The greatest differences were indicated by items assessing whether their staff had sufficient digital knowledge

($\Delta=-1.44, p<.001$) and if they placed greater emphasis on hiring candidates based upon technical competence ($\Delta=-1.48, p<.001$) - this indicates that in the case of companies established in the post-pandemic time frame, digital skills went from being desired to a minimum required level of competencies when hiring.

Table 1: *Likert Sub-Index Results: Impact of Digitalisation on Employment Policy (n = 107)*

Statement (Likert 0–5)	Pre-COVID M ± SD	Post-COVID M ± SD	Δ	p-value
Digitalization plays a key role in employment policy	2.51 ± 1.88	3.35 ± 1.97	−0.84	0.027 *
Staff possess basic technological knowledge	2.36 ± 1.60	3.80 ± 1.44	−1.44	< .001 ***
Technical skills are prioritised during recruitment	2.26 ± 1.68	3.74 ± 1.50	−1.48	< .001 ***
Composite sub-index (aggregate)	2.38 ± 1.62	3.63 ± 1.48	−1.25	< .001 ***

*Note. * $p < .05$; *** $p < .001$. Source: Primary data collected by author, 2025.*

4.2 Automation and the Classification Gap

This study spans from 2009 through 2025. It examines how there is an increasing disconnect between developing digital professionals and the process for formally recognizing them. Albania's National List of Professions (NLP) was last amended in 2017. At that time, the number of codes increased from 4,225 to 5,443. Since then, it has not been updated. During and subsequent to the COVID-19 pandemic, the Albanian digital economy have changed. By the end of 2025 at least six consolidated digital professions were missing from the NLP:

(1) Social Media Manager / Digital Marketing Specialist;

(2) Digital Content Creator / Influencer;

(3) Data Scientist / Digital Business Analyst;

(4) Cybersecurity Analyst (as a separate recognized profession from general IT Administration);

(5) Mobile Application Developer / DevOps Engineer;

(6) E-commerce Specialist.

These omissions are significant. According to an INSTAT survey, 86.4% of companies use social media for marketing purposes. Additionally, 75.5% provide products or services online. Moreover, between 2018 and 2022, the percentage of firms employing ICT

specialists rose from 23.4% to 28.4%. Decision No. 753/2023 of the Council of Ministers established fiscal recognition for various broad categories of digital activities (such as software programming, data processing and digital advertising). However, these measures do not establish either professional classification codes, competence profiles, or educational requirements.

The consequence is a paradoxical situation described both by Eurobond (2020) and ETF (2022). Namely, employees who possess recognized vocational qualifications for web development or multimedia (AKAFPK, 2023) have no way to identify themselves as a specific category of worker in national employment statistics because no such NLP code exists. In addition to being an issue in terms of economic inequality, the absence of professional classification provides an institutional basis for the marginalization of workers in the gig-economy, as explained by De Stefano (2016). The lack of clear professional classifications prevents INSTAT from breaking down the increasingly large ICT workforce into sub-professions, thereby hindering targeted, evidence-based policies for reskilling programs. Although digitalization is identified as a priority in the National Employment and Skills Strategy 2023 - 2030, it lacks sufficient detail about labor market demands. Therefore, its programs will continue to be generalized. In addition to these statistical implications for policymaking, the 2024 legal dispute over taxation levels for freelancers under Decision No. 753/2023 indicates that this institutional failure also has significant human implications.

5. DISCUSSION

Three related conclusions arise from the results. Firstly, COVID-19 represented an institutional shock that led to increased uptake of digitalization and permanent changes in expectations about workers' roles within organizations, thus supporting the mechanism proposed by George et al. (2020: 1754–1756). The sizeable gap in Digi Score scores between cohorts before the pandemic and after represents a structural, rather than cyclical, divergence in the digital culture of organizations.

Secondly, the labour market appears to be dividing into two distinct groups based on education in line with skill-biased technological change theory (Autor et al., 1998: 1170), as evidenced by the strong negative relationship between primary-educated staff and digital capability and the corresponding positive relationship with tertiary educated staff. In addition to these relationships, 56.9% of employees in the firms surveyed had only primary or secondary qualifications. Gashi & Liça (2023: 20) report that qualified employee recruitment has been a long-standing problem for Albanian SMEs, and this issue is becoming even greater as digital capabilities become required minimums for new hires.

Thirdly, institutions have not adapted sufficiently to changing market conditions. The NLP classification gap represents much more than just an administrative technicality; it represents the mechanisms through which many parts of the expanding digital workforce will remain unseen by the data-collecting tools used to inform statistical and policy decisions. These issues are similar to those identified by ITU (2021) concerning how developing countries experience rapid growth of digital labour markets but also grow too quickly to establish effective regulatory oversight and, similarly, to those reported by ILO (2023: 8) regarding professional misclassification creating barriers to career advancement opportunities and worker protections for individuals employed in occupations adjacent to the information technology sector.In comparison to its regional neighbors, Albania ranks lowest among the Western Balkan countries regarding internet penetration rates at 86.1 percent (World Bank, 2024). Albania ranks behind Kosovo (at 96.6 percent) and near Bosnia and Herzegovina (at 86.7 percent) regarding internet penetration rates; however, Albania's penetration rate is substantially below the EU-wide average of 93.1 percent. As demonstrated by Ognjanović et al. (2024) there exists a significant association between the maturity of a country’s digital infrastructure and an organization’s level of digital capacity in the region. Therefore, the lack of sufficient digital infrastructure in Albania contributes further to the educational and institutional barriers previously mentioned.

6. CONCLUSIONS & RECOMMENDATIONS

To begin with, the current study provides a large-scale empirical overview of the impact of the introduction of digital technology on the Albanian labor market. Data was collected through surveys of companies. **The three key findings include:**
a) Acceleration of Digitalization after COVID-19, b) A high degree of structural polarization regarding the digital divide between the better educated and less educated (unskilled), c) An institutional "blind spot" as a result of an outdated classification system for professionals. These findings support the central thesis of this paper: that the changes in Albania's labor market since the COVID-19 pandemic have been due to the country's rapid digital transformation. These changes can be measured by several indicators, including the number of jobs, the form of work, and the size of the digital divide.

Recommendations for specific stakeholders follow:

1) Policymakers need to immediately order a third version of the National List of Professions. Specifically, they need to add new codes for the six types of digital professions that were previously classified. This will allow policymakers to develop evidence-based policies related to job creation and job protection based upon their ability to measure employment trends.

2) The National Employment and Skills Strategy 2023 - 2030 needs to be revised so it includes specific digital skill goals that align with NLP Codes. This will enable reskilling programs to target those occupational areas where there is a shortage of qualified personnel as defined by INSTAT data.

3) Institutions of higher education and vocational schools need to provide digital literacy training outside of major cities and narrow the significant digital literacy disparities that exist between urban and rural residents, which are documented extensively (e.g., World Bank, 2022; p. 25) and continue to grow.

4) Large national/international corporations need to invest in formal in-house training of low-skilled/ low-educational attainment employees. Low-skilled, low-educational attainment employees comprise approximately two-thirds of the total workforce but are disproportionately vulnerable to technological unemployment.

5) Future studies should use an analytical approach that examines both company and individual worker levels. Future studies should examine the long-term financial stability and contract security of workers employed in unclassified digital occupations, along with demographic information about workers in unclassified digital occupations.

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