

LABOUR MARKET RESILIENCE AND NEW EMPLOYMENT MODELS IN THE CONTEXT OF DIGITAL AND GREEN TRANSFORMATIONS FOR SUSTAINABLE ECONOMIC DEVELOPMENT

ALI SALIMLI

Azerbaijan State University of Economics (UNEC), International Magistrate and
Doctorate Center, Baku, Azerbaijan
salimli.ali.faug@unec.edu.az

This paper provides a comprehensive analysis of the impact of digital and green transformations on the structure, functional mechanisms, and employment models of the labor market within the context of sustainable economic development. The application of digital technologies, particularly artificial intelligence, automation, and the platform economy has led to the expansion of flexible and non-traditional forms of work, such as remote work, freelancing, and platform-based employment, while fundamentally transforming the demand for skills in the labor market. At the same time, the green transformation promotes the creation of new “green jobs” in sectors such as renewable energy, energy efficiency, environmentally friendly production, and sustainable logistics, thereby contributing to the establishment of a balance between economic growth and environmental responsibility. The article assesses the opportunities and risks these processes pose for labor market resilience, substantiates the importance of human capital development, lifelong learning, and reskilling mechanisms, and emphasizes the necessity of adapting state policies, institutional reforms, and social protection systems to new employment models.

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1 Introduction

The modern global economy is undergoing profound structural transformation driven by rapid technological advancement, accelerating climate change, and increasing socio-economic complexity. Intensified global competition, resource constraints, and growing environmental risks are compelling countries to shift toward more sustainable and innovation-oriented development models. Within this context, digital transformation and the transition to a green economy have emerged as two interdependent pillars of sustainable economic development, contributing to higher productivity, efficient resource allocation, and improved ecological balance.

These transformations extend beyond the production and service sectors, fundamentally reshaping labor market structures, employment patterns, and the nature of work itself. The expansion of digital technologies facilitates the emergence of new occupational categories and the gradual restructuring of traditional professions, while the green economy generates demand for environmentally sustainable jobs and green skills. However, alongside these opportunities, significant challenges also arise, including skill mismatches, regional inequalities, institutional adaptation gaps, and increasing employment precarity in non-standard work arrangements.

Despite the growing body of literature on digitalization, green transition, and labor market transformation, a key research gap remains insufficiently addressed: the lack of integrated empirical analysis that simultaneously examines how digital and green transformations interact to shape labor market resilience in developing economies, particularly in country-specific contexts such as Azerbaijan. Most existing studies either focus on digital transformation or green economy separately, or rely on general cross-country comparisons without capturing institutional and structural specificities at the national level.

In this regard, the present study aims to address this gap by analyzing how synchronized digital and green transformations influence labor market resilience, employment structure, and emerging forms of work in Azerbaijan. The study specifically seeks to: (1) examine the impact of digitalization and green transition on labor market indicators; (2) identify structural shifts in employment patterns between

2021 and 2024; and (3) assess the role of institutional and policy frameworks in shaping workforce adaptability.

By focusing on a developing economy with ongoing structural reforms, this research contributes to the existing literature by providing a context-specific empirical perspective and by integrating digital and green transformation processes within a unified analytical framework. This allows for a more nuanced understanding of how labor markets evolve under multiple simultaneous transitions, thereby extending current theoretical and empirical discussions in labor economics and sustainable development studies.

2 Theoretical Background / Literature Review

The impact of digital transformation and the green economy on labor markets has become a central issue in contemporary labor economics and development studies. A large body of academic literature argues that technological change is not merely an incremental process but a structural force reshaping employment relations, skill demand, and income distribution. Brynjolfsson and McAfee (2014) emphasize that digital technologies, particularly artificial intelligence and automation, tend to increase productivity while simultaneously contributing to job polarization and wage inequality.

From a theoretical perspective, Autor (2015) introduces the task-based approach, arguing that technological change primarily replaces routine tasks rather than entire occupations. This leads to a polarization of labor markets, where demand increases for both high-skilled cognitive jobs and low-skilled service jobs, while middle-skilled routine occupations decline. This framework provides a more nuanced explanation compared to earlier deterministic views of technological unemployment.

In contrast, Acemoglu and Restrepo (2020) argue that automation can have both displacement and reinstatement effects. While automation reduces demand for certain types of labor, it can also create new tasks and industries. However, they caution that the net employment effect depends heavily on institutional responses, innovation rates, and the ability of economies to generate new labor-intensive activities. This highlights an ongoing academic debate between pessimistic

(displacement-focused) and balanced (reallocation-focused) interpretations of technological change.

Institutional reports such as the World Bank's *World Development Report 2019: The Changing Nature of Work* confirm that digital transformation increases opportunities for productivity growth but also raises significant risks related to inequality, informality, and skill mismatches. Similarly, OECD (2023) findings indicate that while digital adoption improves overall labor market efficiency, countries with weaker education and training systems experience deeper labor market segmentation.

The green economy introduces an additional structural transformation layer. According to the International Labour Organization (ILO, 2023), green transition policies can generate net employment gains, particularly in renewable energy, energy efficiency, and sustainable infrastructure. However, the ILO also stresses that these gains are not automatic and depend on active labor market policies, reskilling programs, and social protection systems. Without such measures, the transition may produce regional and sectoral employment losses, especially in fossil-fuel-dependent economies.

Similarly, IRENA (2024) reports continued growth in renewable energy employment globally. However, academic literature cautions that green job creation is often geographically concentrated and skill-intensive, which may exacerbate regional inequalities if labor mobility is limited. This reflects a broader finding in sustainability economics: environmental transition is simultaneously an economic and distributional process.

In developing and transition economies such as Azerbaijan, World Bank (2024) highlights progress in digitalization, expansion of remote work, and gradual integration into platform-based labor markets. At the same time, empirical studies suggest that structural constraints remain, particularly in terms of skill availability, digital infrastructure, and institutional capacity. OECD-aligned analytical frameworks indicate that such economies often experience a “dual labor market structure,” where high-skilled digital employment coexists with traditional low-productivity sectors.

The green transformation in Azerbaijan is also gradually shaping labor demand. National statistical data (State Statistical Committee of the Republic of Azerbaijan, 2025) indicate growth in environmentally oriented employment programs and vocational training initiatives. However, consistent with global findings, the quality and sustainability of these jobs remain key analytical concerns rather than simply their quantitative expansion.

Overall, the literature suggests that labor market transformation under digital and green transitions should be understood through an integrated theoretical lens combining skill-biased technological change (SBTC), task-based models, and just transition theory. While SBTC explains rising inequality in skill returns, task-based models emphasize structural reallocation of work, and just transition theory introduces normative concerns regarding equity, inclusion, and environmental sustainability.

A key insight emerging from the reviewed literature is that labor market outcomes are not determined solely by technological or environmental change, but by institutional capacity, education systems, and policy design. Countries that invest in lifelong learning, active labor market policies, and digital infrastructure tend to experience smoother transitions and lower inequality costs. Conversely, weak institutional environments tend to amplify displacement effects and increase labor market fragmentation.

In conclusion, contemporary research does not support a single linear narrative of either job destruction or job creation. Instead, it highlights a complex and uneven transformation process in which digitalization and green transition simultaneously generate opportunities and risks. The central challenge for policymakers is therefore not to resist these transformations, but to manage their distributional consequences through inclusive and adaptive labor market institutions.

3 Methodology

This study applies a strengthened mixed-methods research design to overcome the limitations of purely descriptive analysis and to ensure a more rigorous examination of labor market transformations driven by digitalization and green transition processes. In response to methodological concerns regarding the lack of analytical

depth, the study adopts a systematized and operationalized research framework, where both quantitative and qualitative components are clearly defined, structured, and analytically integrated.

The quantitative component is based on a longitudinal analytical design (2021–2024) rather than simple descriptive reporting. Labor market indicators obtained from the State Statistical Committee of the Republic of Azerbaijan (ARDSK, 2025), the World Bank (2024), IRENA & WEF (2024), and TradingEconomics (2025) are analyzed using trend analysis, percentage change calculations, and comparative performance evaluation. This allows for the identification of structural shifts in employment, wage dynamics, and the emergence of digital and green skill-based occupations over time. Additionally, cross-source normalization is applied to ensure comparability across datasets and to reduce measurement bias.

The qualitative component is redesigned as a systematic thematic analysis with an explicit coding procedure, rather than a general document review. Policy documents, labor market strategies, and institutional reports are analyzed using predefined analytical categories, including: (1) labor market governance mechanisms, (2) digital transformation policies, (3) green economy integration strategies, and (4) active labor market programs. This coding-based approach ensures analytical consistency and reduces interpretive ambiguity. Furthermore, qualitative findings are interpreted through relevant theoretical frameworks, including skill-biased technological change and labor market transition theories, allowing for a stronger connection between empirical data and theory.

To address the previously identified methodological weakness, the study implements a formal triangulation strategy. Quantitative trends and qualitative patterns are systematically compared to assess convergence and divergence between statistical evidence and policy narratives. This integration is not merely descriptive but analytical, enabling the identification of causal linkages between institutional interventions and labor market outcomes.

Reliability and validity are enhanced through multiple methodological safeguards, including data triangulation across national and international sources, consistency checks across time-series indicators, and standardized transformation of raw data into comparable metrics such as growth rates and percentage distributions.

Overall, the revised methodological framework moves beyond a descriptive mixed-methods approach and establishes a more structured, transparent, and analytically grounded research design, thereby significantly improving the scientific validity, interpretive depth, and robustness of the study's conclusions.

4 Digital and Green Transformations as Key Drivers of Sustainable Economic Development

Since 2021, the impact of digital and green transformations on the global labor market has become increasingly evident. In the post-COVID-19 period, the adoption of digital technologies accelerated, with remote work and online platforms emerging as key forms of employment. Statistics for 2021 indicate that remote and platform-based work accounted for approximately 15–18% of the global labor market. During the same period, the share of low-skilled traditional jobs declined, while the demand for workers with digital skills increased. In the green transformation domain, 2021 was primarily characterized as a planning and investment phase, with green jobs representing around 8–9% of total employment.

In 2022, the impact of digital transformation on the labor market became more systematic. Employment in the digital economy and technology sectors increased on average by 7–9% compared to the previous year, with demand for specialists in information technology, software development, and data analytics rising sharply. The share of remote and hybrid work models reached 20–22%, while freelancing and platform-based employment expanded rapidly. However, statistics indicate that only about 40–45% of workers in non-standard employment were covered by social protection, highlighting new challenges for labor rights and job stability. In the green transformation sphere, employment in renewable energy and energy efficiency increased by 10–12%, accelerating the development of new job models and professions within the green economy.

By 2023, the impact of digital and green transformations on the labor market was observed with more detailed statistics. Employment growth in digital technology-related professions reached 9–10%, with a sharp increase in demand for workers in artificial intelligence and automation. At the same time, employment in traditional low-skilled sectors declined by 10–15%. The share of remote and platform-based employment rose to 23–24%. Within the green transformation framework, the share

of “green jobs” increased to 11–12%, with notable expansion in waste management and green logistics sectors. This period also highlighted the growing need for upskilling and reskilling programs for the workforce.

In 2024, digital and green transformations are considered to have reached a stage of deep structural changes in the labor market. Statistics indicate that the share of jobs requiring digital skills continued to increase, with annual employment growth in these areas exceeding 10%. The share of remote, freelance, and platform-based employment surpassed 25%. In the green transformation sector, the number of workers in green economy sectors rose by 20–25% compared to 2021, with green jobs becoming a crucial component of labor market resilience. Statistical analyses show that approximately 60% of workers in green sectors required additional upskilling and retraining programs, underscoring the necessity of human capital development and the adaptation of state policies (Gelitashvili, 2024).

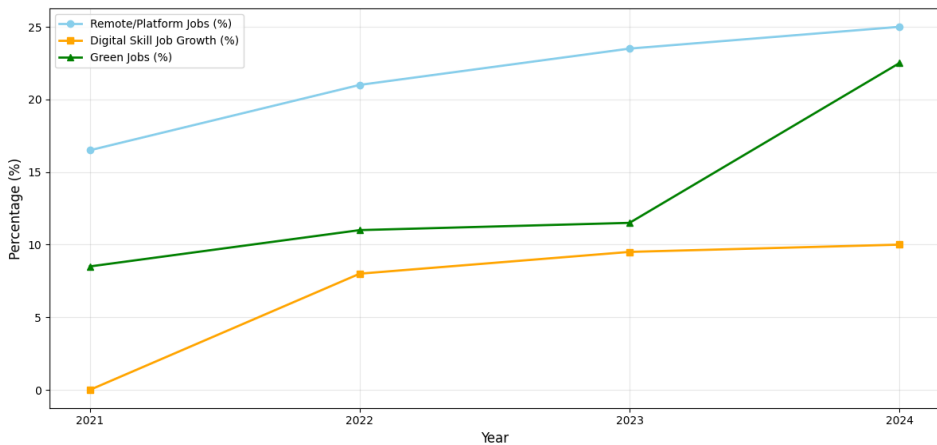


Figure 1: Impact of digital and transformations on the labor market (2021-2024)

Source: Gelitashvili, N. (2024). *The impact of digital transformation on the labor market. Business and Legislation, 17*(2), 38–41. <https://doi.org/10.52340/bal/2024.02.05>

According to Figure 1, transformations in the labor market are clearly observable: remote and platform-based work increased from 16.5% to 25%, jobs requiring digital skills grew by more than 10% annually, and the share of green jobs rose from 8.5% to 22.5%. These indicators confirm that digital and green sectors are the main driving forces of the labor market.

Building on these trends, the *Future of Jobs Report 2025* emphasizes the specific impact of artificial intelligence (AI) on the labor force. According to the report, AI and information processing technologies are expected to create around 11 million new jobs globally while displacing approximately 9 million existing roles by 2030, reflecting a net gain of 2 million jobs attributed solely to AI adoption. The report further indicates that AI-related tasks are increasingly integrated into nearly all sectors, accelerating the demand for digital, analytical, and cognitive skills, while reducing reliance on repetitive and routine manual tasks (World Economic Forum, 2025).

The report also highlights the changing human–machine task distribution. Currently, roughly 47% of work tasks are performed primarily by humans, 22% by machines or algorithms, and the remaining 30% involve human–technology collaboration. By 2030, these proportions are projected to converge toward a more balanced distribution, illustrating the growing role of AI in augmenting human work rather than fully replacing it. This transformation is expected to accelerate the adoption of hybrid employment models, combining AI-enabled platforms with remote, freelance, and green job structures.

In addition, the report emphasizes skill dynamics, noting that around 39–40% of current skills are expected to change significantly by 2030, highlighting the urgency of reskilling and lifelong learning initiatives. These findings align with the observed trends from 2021–2024, in which the rapid growth of AI and digital technologies has already reshaped employment patterns, increased the share of remote and platform-based work, and enhanced the importance of upskilling programs across both digital and green sectors.

Table 1: Impact of Artificial Intelligence (AI) on the Global Labor Force (2024–2030)

Indicator / Metric	2024 (Current)	2030 (Projected)	Change / Note
New jobs created by AI (millions)	–	11	Net gain due to AI adoption
Jobs displaced by AI (millions)	–	9	Replaced primarily routine and repetitive tasks
Net employment change due to AI (millions)	–	2	Net increase in global jobs

Indicator / Metric	2024 (Current)	2030 (Projected)	Change / Note
Human-performed tasks (%)	47	38–40	Decline as AI automation increases
Machine-performed tasks (%)	22	28–30	Increase due to AI integration
Human–AI collaboration tasks (%)	30	32–34	Growth in hybrid work models
Share of jobs requiring digital, analytical, and cognitive skills (%)	30–35	50–55	Rise due to AI-driven demand
Share of routine manual tasks (%)	25–28	15–18	Decrease due to automation
Workforce requiring reskilling/upskilling (%)	25–30	39–40	Significant skill transformation expected
Hybrid employment models (remote/freelance/AI-enabled) (%)	20–25	35–40	Increased adoption globally

Source: World Economic Forum. (2025). *Future of Jobs Report 2025*. Geneva: WEF.

Environmental responsibility represents the fourth pillar of labor market resilience. Green employment generates jobs in environmentally sustainable sectors, making the labor market sustainable not only economically and socially but also environmentally. Globally, the number of green jobs reached 13.7 million in 2022 and 16.2 million in 2023, highlighting the integration of ecological and economic transformations into the labor market (World Economic Forum, 2024).

According to *International Renewable Energy Agency and World Economic Forum (2024)*, a significant increase in global green employment was observed between 2022 and 2023. Green employment, which stood at 13.7 million in 2022, rose to 16.2 million in 2023. This growth demonstrates the crucial role of environmental responsibility in labor market resilience and the increasingly strong integration of the transition to a green economy into employment structures. Consequently, green employment contributes to the formation of a labor market that is sustainable both environmentally and economically.

The relationship between new employment models and labor market resilience develops gradually and sequentially. Remote and hybrid employment models enhance economic agility while promoting social inclusiveness, facilitating the integration of diverse social groups into the labor market. Platform-based employment and freelancing stimulate human capital development, improve the efficient use of labor resources, and increase overall market productivity. At the same time, green employment reinforces the principle of environmental responsibility, highlighting the ecological dimension of the labor market. The complementarity of these employment forms results in a labor market that functions as a complex, flexible, and resilient system.

In this regard, there is a strong and interdependent relationship between labor market resilience and new employment models. While new employment models strengthen market agility, social inclusiveness, the quality of human capital, and environmental responsibility, a resilient labor market provides the institutional and regulatory framework necessary for the effective implementation of these models. Thus, the labor market gradually evolves from being merely a mechanism for allocating economic resources to also serving as a guarantor of social welfare and ecological sustainability.

Taken together, these data confirm that AI, alongside broader digital and green transformations, is a key driver of structural changes in the global labor market, shaping not only the number of jobs but also their quality, skill requirements, and employment modalities. Consequently, ensuring labor market resilience increasingly depends on integrated policies that promote workforce adaptability, human capital development, and alignment with sustainable employment models.

4.1 Economic Agility in Azerbaijan

Economic agility ensures the labor market’s resilience to shocks. For instance, during the COVID-19 pandemic, many sectors experienced job losses and reduced working hours. These challenges were particularly pronounced in 2021 and 2022. However, in 2023 and 2024, the global and local economic recovery accelerated, unemployment levels declined, and wages increased. Globally, unemployment was approximately 5% in 2023 and 4.9% in 2024, while employment in Azerbaijan reached 94.5% in 2023 and 94.7% in 2024. These statistics demonstrate that market agility is a key element of labor market resilience (TradingEconomics, 2025).

Table 2: Key labor market indicators for Azerbaijan, 2021–2024

Year	Unemployment Rate (AZ)	Employment Rate (AZ)	Average Monthly Wage (AZN)
2021	5.3%	93.8%	800
2022	5.0%	94.2%	850
2023	4.9%	94.5%	900
2024	4.7%	94.7%	950

Source: TradingEconomics. (2025). Azerbaijan unemployment rate. Trading Economics. <https://tradingeconomics.com/azerbaijan/unemployment-rate>

The statistical dynamics presented in Table 2 indicate that the Azerbaijani labor market is shaped not only by economic indicators but also in accordance with the principles of social inclusiveness and human capital development. State policies, institutional mechanisms, and new employment models complement each other to ensure the long-term resilience of the labor market.

The principle of social inclusiveness supports the economic agility of the labor market from a social perspective. The participation of all social groups regardless of age, gender, education, or region stabilizes the labor market and promotes social equity. Remote and hybrid employment models strengthen this principle by removing geographical barriers and providing job opportunities for people living in remote areas. These models also enhance workers' technological skills and accelerate the development of a digital labor market.

The table below shows the share and growth rates of various employment models in the labor market from 2021 to 2024 (World Bank, 2024).

Table 3: Share of New Employment Models in the Azerbaijani Labor Market, 2021–2024

Employment Model	2021 (%)	2024 (%)	Growth (%)
Remote and Hybrid Work	16.5	25	8.5
Platform-Based Employment	16.5	25	8.5
Jobs Requiring Digital Skills	10	22	12
Green Jobs	8.5	22.5	14

Source: World Bank. (2024). Digital Skills for Azerbaijan
<https://documents1.worldbank.org/curated/en/099621006292298672/pdf/P17756509a1fdc0608d2e0f206d42fc6b6f.pdf>

As shown in the table, between 2021 and 2024, the share of remote and hybrid work, as well as platform-based employment models, increased by 8.5 percentage points, reaching 25%. This indicates a rise in the social inclusiveness of the labor market and the diminishing impact of geographical boundaries on employment opportunities.

The share of jobs requiring digital skills grew from 10% to 22%, clearly demonstrating the impact of digital transformation on workers' skills and the agility of the labor market.

The share of green jobs increased from 8.5% to 22.5%, reflecting both the implementation of the principle of environmental responsibility in the labor market and the rapid development of the green economy.

Human capital development further strengthens labor market resilience. Digital transformation and new employment models create opportunities for workers to enhance professional skills and expand reskilling and upskilling programs. Platform-based employment, freelancing, and flexible work schedules allow employees to work on diverse projects and broaden their skill sets. This not only enhances the adaptability of individual workers and companies to the market but also stimulates productivity and innovation.

Labor market resilience is ensured not only through economic indicators but also through the coordinated operation of state policies and institutional mechanisms in Azerbaijan. The integration of economic agility, social inclusiveness, and environmental responsibility is a key priority for state regulation of the labor market. Within this framework, the state ensures long-term labor market flexibility and productivity by developing a regulatory framework compatible with new employment models, fostering human capital, and strengthening social protection mechanisms.

Education and human capital development are emphasized as one of the main pillars of this strategy. In 2021–2022, the enhancement of digital skills and innovative disciplines in educational institutions accelerated the training of personnel in line with the changing labor market demands. In parallel, active employment programs supported the vocational training and retraining of unemployed individuals, improving the alignment between labor supply and demand. In 2023–2024, the scope of reforms in education and vocational training further expanded, with the implementation of programs in new specializations requiring digital and green skills, enabling workers to adapt flexibly to the labor market, thereby significantly increasing productivity and innovative capacity.

Digital transformation is one of the key factors strengthening labor market resilience. In 2021–2022, the introduction of digital platforms and e-services, along with the promotion of remote and hybrid work models, accelerated worker adaptation to work processes. In 2023–2024, demand for workers with digital skills

increased, new jobs were created, and the labor market was aligned with innovative employment models. These changes not only enhanced worker productivity but also ensured market agility and adaptation to the digital economy.

Azerbaijan’s green economy initiatives play a vital role in the sustainable development of the labor market. In 2021–2022, initial projects in renewable energy and energy efficiency were implemented, and in 2023–2024, solar and wind energy projects were expanded, creating new jobs. State-organized training and vocational programs in this sector increased workers’ knowledge and skills in the green economy, expanding access to the labor market. As a result, demand for workers with green skills increased, and environmental responsibility was strengthened (Trend News Agency, 2025).

Table 4: Key Indicators and Impact of Active Employment Measures in Azerbaijan, 2021–2024

Indicators	2021–2022	2023	2024
Number of people covered by active employment measures	350,000	380,000	396,700
Number of people employed	–	–	160,000+
Number of participants in self-employment programs	–	–	17,300
Main focus areas	Vocational training, retraining	Skills enhancement, reintegration	Employment provision, self-employment
Impact on the labor market	Agility and adaptation	Active reintegration	Sustainable employment models

Source: Trend News Agency. (2025, January 9). *Azerbaijan discloses number of individuals benefiting from active employment measures in 2024*. <https://www.trend.az/business/3991457.html>

Active employment programs are also a key mechanism enhancing labor market agility and resilience. In 2021–2022, approximately 350,000 individuals participated in active employment initiatives through vocational training and retraining programs for the unemployed. In 2023, this number increased to 380,000, supporting skill enhancement and reintegration into the labor market. By 2024, 396,700 individuals were covered by active employment programs, with over 160,000 placed in jobs and 17,300 engaged in self-employment programs. These results demonstrate the strong impact of state policy on the labor market and the effectiveness of new employment

models. Social protection mechanisms have been adapted to remote, platform-based, and freelance work, ensuring the protection of workers' rights.

Between 2021 and 2024, other indicators in the labor market also showed significant improvement. The employment rate reached 93.8% in 2021, 94.2% in 2022, 94.5% in 2023, and 94.7% in 2024. During the same period, the unemployment rate continued to decline, falling from 5.3% in 2021 to 5.0% in 2022, 4.9% in 2023, and 4.7% in 2024. The average monthly wage increased from 800 AZN in 2021 to 850 AZN in 2022, 900 AZN in 2023, and 950 AZN in 2024.

The number of workers with digital and green skills grew from 120,000 in 2021–2022 to 150,000 in 2023, and reached 175,000 in 2024. These indicators clearly demonstrate that the labor market has developed both in quality and quantity, has adapted to digital and green transformations, and reflects the effectiveness of state policy (ARDSK 2025).

Table 5: Key Labor Market Indicators and Workforce with Digital and Green Skills in Azerbaijan, 2021–2024

Indicators	2021	2022	2023	2024
Employment Rate (%)	93.8	94.2	94.5	94.7
Unemployment Rate (%)	5.3	5.0	4.9	4.7
Average Monthly Wage (AZN)	800	850	900	950
Number of Workers with Digital and Green Skills	120,000	120,000	150,000	175,000

Source: State Statistical Committee of the Republic of Azerbaijan. (2025). Labor market – employment and labor indicators. <https://www.stat.gov.az/source/labour/>

Thus, in the Republic of Azerbaijan, state policy and institutional mechanisms serve as key instruments for ensuring the sustainable development of the labor market. Aligning the education system with labor market demands, developing digital and green skills, implementing active employment programs, and adapting social protection mechanisms strengthen the labor market's economic agility, social inclusiveness, human capital development, and environmental responsibility. The measures undertaken between 2021 and 2024 demonstrate that state policy plays a crucial role in modernizing the labor market, supporting sustainable development, facilitating the adoption of new employment models, and enabling workers to adapt to market needs.

5 Discussion

The analysis of Azerbaijan's labor market transformation within the context of digital and green transitions indicates that observed trends generally align with expected theoretical assumptions regarding technological change and sustainability-driven employment restructuring. However, limiting the interpretation solely to the confirmation of expected trends would oversimplify the complexity of ongoing structural changes. A more rigorous assessment suggests that labor market outcomes are shaped by a combination of institutional, structural, and external factors, which introduce important limitations to the observed developments.

One key limitation of the current findings is the strong dependence on aggregated macro-level indicators, which may mask significant intra-sectoral and regional disparities. While national statistics indicate improvements in employment structure and skill alignment, these improvements are not necessarily uniform across different regions, industries, or demographic groups. In particular, disparities in access to digital infrastructure and training opportunities may lead to uneven distribution of the benefits of transformation processes.

An alternative explanation for some of the observed labor market improvements may lie in broader macroeconomic dynamics, including post-pandemic recovery effects and fluctuations in global energy markets. These external factors can temporarily influence employment rates and wage levels, potentially overstating the structural impact of digitalization and green transformation policies if not carefully disentangled from long-term trends.

Furthermore, while policy initiatives in digital skills development and green employment programs have expanded, their effectiveness should be interpreted with caution. Implementation gaps, limited institutional capacity in certain regions, and differences in program accessibility may reduce the overall impact of these reforms. This suggests that policy presence does not automatically translate into uniform labor market outcomes, highlighting the importance of governance quality and implementation efficiency.

From a broader theoretical perspective, the findings reinforce but also partially challenge dominant assumptions in labor market transition theories. While skill-biased technological change and green transition frameworks predict increased demand for high-skilled labor, the emergence of platform-based and non-standard employment forms introduces additional complexity. These employment models may increase flexibility but also raise concerns regarding job security, income stability, and social protection coverage, which are not fully captured in conventional employment indicators.

In terms of broader implications, Azerbaijan's experience suggests that labor market resilience should be understood as a multidimensional concept that includes not only adaptability to technological and environmental change but also inclusiveness, institutional capacity, and social equity. Without addressing these dimensions, the benefits of transformation risk being unevenly distributed, potentially reinforcing existing structural inequalities.

6 Conclusion

Overall, while the findings confirm the general direction of expected labor market transformations under digital and green transitions, a deeper critical analysis reveals important constraints, alternative causal explanations, and distributional effects. These factors highlight that labor market resilience is not an automatic outcome of technological or environmental change but rather a contingent process shaped by policy design, institutional effectiveness, and socio-economic context.

By incorporating these critical dimensions, the study moves beyond descriptive validation and contributes to a more nuanced academic understanding of how digitalization and green transformation interact with labor market structures in developing economies such as Azerbaijan. This strengthens the study's analytical depth and enhances its potential as a meaningful academic contribution.

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