DIGITALISATION AND AI: EFFECTS ON LABOUR MARKET INEQUALITIES IN THE EU

Liviu RADU[*]

Carmen RADU [**]

Abstract

Accelerated digital transformation and the widespread adoption of artificial intelligence have profoundly reshaped labour markets across the EU over the past decade. This paper examines the socio-economic effects of digitalisation and artificial intelligence on occupational structures, income distribution, and skills polarisation in EU Member States during the period 2015–2025.

The study relies on secondary statistical data provided by Eurostat, the OECD, and the World Bank, applying a comparative quantitative approach based on indicators such as the employment rate, the evolution of the Gini coefficient, participation in lifelong learning, and the share of jobs exposed to the risk of automation.

The findings reveal significant disparities between Western Europe and Central and Eastern Europe, highlighting the widening digital divide and the increasing polarisation of skills. While highly skilled workers benefit from productivity gains and wage growth, low-skilled workers face heightened risks of job displacement and economic insecurity. Unequal access to reskilling programmes further contributes to the deepening of socio-economic inequalities.

The paper advances public policy recommendations aimed at strengthening active labour market measures, expanding lifelong learning systems, and fostering public–private partnerships as essential instruments for ensuring an inclusive digital transition.

Keywords: *digitalisation, artificial intelligence, labour market, socio-economic inequalities, European Union, skills polarisation.*

1. Introduction

Digital transformation represents one of the most powerful drivers of economic restructuring in recent decades. The integration of artificial intelligence (AI), process automation, the use of big data, and the expansion of digital platforms have fundamentally altered production structures, work organisation, and the distribution of value added within the European Union.

During the period 2015–2025, the European Union underwent an accelerated phase of digitalisation, marked by:

- the implementation of the Digital Single Market Strategy (2015);
- the launch of the Digital Europe Programme (2021–2027);
- the adoption of the Artificial Intelligence Act (AI Act);
- the consolidation of the twin transition: digital and green.

This transformation has generated ambivalent effects. On the one hand, it has stimulated productivity growth, innovation, and competitiveness. On the other hand, it has intensified occupational polarisation and socio-economic inequalities, particularly in Member States with lower levels of digital human capital.

This paper aims to examine:

- The impact of digitalisation and artificial intelligence on the structure of the labour market;
- The relationship between digital transformation and socio-economic inequalities;
- The structural differences between Western Europe and Central and Eastern Europe;
- The public policy directions required to ensure an inclusive digital transition.

[*] Lecturer, PhD, Faculty of International Relations and Administration, „Nicolae Titulescu“ University of Bucharest (e-mail: lgradu2005@yahoo.co.uk).

[**] Lecturer, PhD, Faculty of International Relations and Administration, „Nicolae Titulescu“ University of Bucharest (e-mail: emiliacarmenr@yahoo.com).

2. Theoretical and Conceptual Framework

Digital transformation and the integration of artificial intelligence into economic processes have generated a structural reconfiguration of the labour market, leading to the emergence of new theoretical paradigms concerning the relationship between technology, employment, and income distribution. Over the past two decades, the economic and sociological literature has developed several explanatory frameworks relevant to analysing the impact of digitalisation on socio-economic inequalities.

2.1. Skill-Biased Technological Change (SBTC)

The theory of skill-biased technological change (SBTC) argues that technological progress favours highly skilled workers by increasing the demand for cognitive, analytical, and digital competences, to the detriment of routine or low-skilled labour.

Technology does not substitute entire occupations, but rather specific tasks within them[1]. Automation primarily affects repetitive and codifiable tasks, whereas activities involving problem-solving, creativity, or social interaction are more difficult to automate.

This perspective has led to the development of the "task-based" model, which explains occupational restructuring through the analysis of task content rather than solely formal educational attainment. In the context of artificial intelligence, this approach becomes particularly relevant, as advanced AI systems are capable of automating not only manual tasks but also standardised cognitive processes.

2.2. Occupational Polarisation

A direct consequence of skill-biased technological change is labour market polarisation. Goos, Manning, and Salomons demonstrate that, in Europe, digitalisation has led to a simultaneous increase in both high-skilled and low-skilled occupations, alongside a contraction of middle-skilled occupational segments[2].

This phenomenon has significant implications for the structure of the middle class and for social cohesion. Polarisation contributes to:

- rising wage inequality;
- labour market fragmentation;
- reduced intergenerational social mobility.

Moreover, polarisation tends to be more pronounced in economies with high exposure to industrial automation and standardised administrative services.

2.3. Automation and Occupational Risk

The debate on the scope and magnitude of automation was intensified by the study conducted by Frey and Osborne, which estimated that 47% of occupations in the United States were at high risk of computerisation[3].

Subsequently, the OECD revised this methodology, demonstrating that the actual level of risk is significantly lower when the analysis focuses on tasks rather than aggregated occupations[4]. Nevertheless, even under this task-based approach, a substantial share of jobs across European countries remains susceptible to structural transformation.

Within the European Union, exposure to automation varies depending on:

- the sectoral structure of the economy;
- the level of human capital;
- investments in technology and innovation.

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[1] Daron Acemoglu, David Autor, "Skills, Tasks and Technologies: Implications for Employment and Earnings", în Handbook of Labor Economics, Vol. 4B, Elsevier, Amsterdam, 2011.

[2] Maarten Goos, Alan Manning, Anna Salomons, "Job Polarization in Europe", American Economic Review, Vol. 99, No. 2, 2009, pp. 58–63. (AER Papers & Proceedings).

[3] Carl Benedikt Frey, Michael A. Osborne, "The Future of Employment: How Susceptible Are Jobs to Computerisation?", Oxford Martin School, University of Oxford, 2013.

[4] Melanie Arntz, Terry Gregory, Ulrich Zierahn, "The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis", OECD Social, Employment and Migration Working Papers No. 189, OECD Publishing, Paris, 2016.

2.4. Technological Capital and the Dynamics of Inequality

The literature on income distribution emphasises the role of capital in amplifying inequalities. Piketty argues that the rate of return on capital may exceed the rate of economic growth, leading to wealth concentration[5].

In the digital economy, technological capital — including algorithms, data, and digital infrastructure — becomes a strategic factor of production. Ownership of these assets is largely concentrated in multinational corporations and advanced innovation ecosystems, which may further widen disparities among EU Member States.

Consequently, digitalisation does not automatically generate economic convergence; rather, it may contribute to divergence between highly innovative economies and those reliant on traditional sectors.

2.5. The Digital Divide and Skills

The concept of the "digital divide" has evolved from a matter of access to infrastructure to one concerning digital skills and the capacity to use technology productively.

The OECD emphasises that participation in lifelong learning is strongly correlated with initial educational attainment[6], thereby generating a cumulative advantage mechanism: individuals who are already highly qualified are more likely to strengthen their position in the digital labour market.

Within the European Union, disparities in basic and advanced digital skills account for a significant share of regional and wage inequalities.

2.6. Conceptual Model of the Relationship between Digitalization and Socio-Economic Inequalities

In order to integrate the theoretical perspectives discussed above, we propose a synthetic conceptual model that explains the mechanisms through which digitalisation and artificial intelligence influence the labour market and income distribution within the European Union.

The model is based on the premise that digitalisation operates simultaneously through two main channels: the productivity and innovation channel, which generates economic growth and opportunities for highly skilled workers, and the technological substitution channel, which affects routine tasks and middle-skilled occupations, as emphasised in the literature on technological complementarity and substitution[7].

These two mechanisms lead to:

- the restructuring of the occupational structure;
- skills polarisation;
- changes in income distribution.

In turn, these effects are mediated by institutional and educational variables, such as:

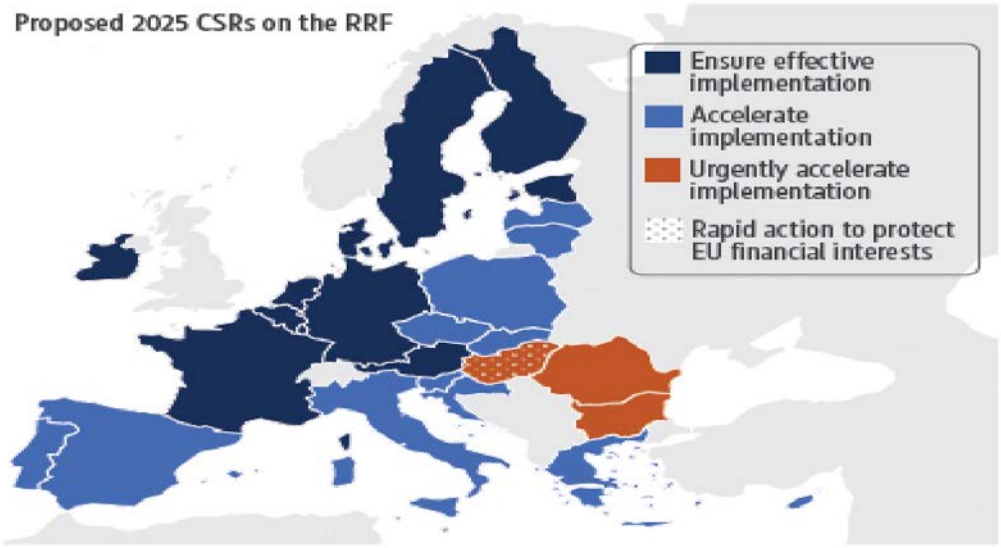
- participation in lifelong learning;
- administrative capacity;
- public investment in digital education;
- the effectiveness of active labour market policies.

[5] Thomas Piketty, Capital in the Twenty-First Century, Harvard University Press, Cambridge, 2014.

[6] OECD, Skills Outlook 2021: Learning for Life, OECD Publishing, Paris, 2021.

[7] David Autor, "Why Are There Still So Many Jobs? The History and Future of Workplace Automation", Journal of Economic Perspectives, vol. 29, no. 3, 2015, pp. 3–30.

Figure 1. Conceptual Model of the Impact of Digitalisation on the Labour Market and Socio-Economic Inequalities



Source: authors' elaboration based on the literature (Acemoglu & Autor, 2011; Goos et al., 2009; OECD, 2019)

The conceptual model highlights that digitalisation does not automatically generate inequality; rather, it interacts with the institutional structure and the level of human capital. In European Union Member States with high levels of investment in education and active labour market policies, the negative effects of automation can be mitigated through appropriate institutional mechanisms[8].

By contrast, in economies characterised by low participation in lifelong learning and limited digital infrastructure, the process may lead to:

- increased labour market segmentation;
- widening wage differentials;
- regional divergence.

The model will guide the empirical analysis developed in the subsequent chapters.

3. Methodological Framework

3.1. Methodological Approach

The present study adopts a comparative quantitative approach based on the secondary analysis of aggregated statistical data at the level of European Union Member States. The period under examination is 2015–2025, an interval that captures the acceleration of Europe's digital transformation, the consolidation of the platform economy, as well as the structural impact generated by the COVID-19 pandemic on work organisation.

The comparative analysis focuses on two groups of Member States:

- Western Europe: Germany, France, the Netherlands, Sweden;
- Central and Eastern Europe: Romania, Bulgaria, Poland, Hungary.

The selection of these countries is justified by the significant differences in levels of digitalisation, technological infrastructure, and human capital performance, as highlighted in the European Commission's annual reports on the Digital Economy and Society[9].

The conceptual model presented in Chapter 2 is operationalised into an empirical framework that examines the relationships between:

- the level of digitalisation (independent variable);
- occupational restructuring and skills polarisation (intermediate variables);

[8] OECD, Employment Outlook 2019: The Future of Work, OECD Publishing, Paris, 2019.
[9] European Commission, Digital Economy and Society Index (DESI) Reports, Brussels, 2015–2024 editions.

- socio-economic inequalities (dependent variable).

3.2. Data Sources and Statistical Foundation

The data employed in this study are drawn from official institutional databases recognised for their methodological comparability at the European level:

- Eurostat – Labour Force Survey (LFS): indicators on employment, occupational structure, and teleworking;
- Digital Economy and Society Index (DESI): measurement of the level of digitalisation;
- OECD Employment Outlook: estimates regarding occupational exposure to automation;
- World Bank – World Development Indicators: Gini coefficient and macroeconomic indicators;
- OECD Skills Outlook 2021: participation in lifelong learning.

The use of these sources ensures methodological consistency and comparative validity, as the indicators are constructed on harmonised European and international statistical frameworks[10].

3.3. Operationalization of Variables

In order to test the hypotheses formulated in Chapter 2, the variables are defined and measured as presented in Table 1.

The operationalisation of variables enables a relational analysis between digitalisation and income distribution through the structural mechanisms previously identified.

Table 1. Operationalisation of Variables in the Conceptual Model

Type of Variable	Variable	Indicator Used	Source
Independent	Level of digitalisation	DESI Index (annual aggregate score)	European Commission
Intermediate	Occupational restructuring	Share of high-/middle-/low-skilled occupations	Eurostat LFS
Intermediate	Exposure to automation	% of jobs at high risk	OECD
Mediating	Lifelong learning	% of adults (aged 25–64) participating in education and training	Eurostat
Dependent	Socio-economic inequality	Gini coefficient (equivalised disposable income)	World Bank

Source: authors' elaboration based on European Commission (DESI), Eurostat LFS, OECD and World Bank data

The DESI Index is employed as a proxy for the overall level of digitalisation, as it integrates dimensions related to connectivity, digital human capital, the integration of digital technologies, and digital public services[11].

3.4. Methods of Analysis

The empirical analysis employs the following instruments:

- Comparative descriptive analysis of developments during the period 2015–2025;
- Bivariate correlation analysis between:
  - DESI and the Gini coefficient;
  - DESI and participation in lifelong learning;
  - exposure to automation and occupational structure;
- Trend analysis to identify processes of regional convergence or divergence.

The methodology is consistent with the approaches used in OECD studies on the future of work and the impact of automation on employment[12].

[10] Eurostat, Labour Force Survey – Methodology and Metadata; World Bank, World Development Indicators; OECD, Skills Outlook 2021: Learning for Life, OECD Publishing, Paris, 2021.

[11] European Commission, Digital Economy and Society Index (DESI) Reports, Brussels, 2015–2024 editions.

[12] OECD, Employment Outlook 2019: The Future of Work, OECD Publishing, Paris, 2019.

The objective is not to estimate a complex causal econometric model, but rather to identify consistent structural relationships and systematic differences between the groups of countries under examination.

3.5. Methodological Limitations

The study is subject to the following limitations:

- the use of nationally aggregated data may conceal internal regional disparities;
- DESI is a composite index, and the weighting of its subcomponents may influence the interpretation of results;
- correlation analysis does not automatically imply causal relationships;
- the period 2020–2022 reflects exceptional effects generated by the COVID-19 pandemic, which may artificially amplify certain trends (e.g. teleworking).

Nevertheless, the adopted methodology allows for the formulation of relevant conclusions regarding the relationship between digital transformation and socio-economic inequalities within the European Union.

4. The Evolution of Digitalisation in the European Union (2015–2025)

4.1. The Overall Dynamics of Digitalisation in the EU

During the period 2015–2025, digital transformation became one of the European Union's key strategic priorities, supported initially through the implementation of the Digital Single Market Strategy (2015) and subsequently through the Digital Europe Programme (2021–2027). The level of digitalisation has been systematically measured through the Digital Economy and Society Index (DESI), published annually by the European Commission[13].

The DESI index integrates four main dimensions:

- digital human capital;
- connectivity;
- the integration of digital technologies in businesses;
- digital public services.

Between 2015 and 2024, the EU average recorded a steady increase in the aggregate score, reflecting:

- the expansion of high-speed broadband networks;
- the growing use of digital public services;
- the development of basic digital skills.

However, progress has not been uniform across Member States.

4.2. Comparative Analysis: Western Europe vs. Central and Eastern Europe

The structural differences between Western European and Central and Eastern European Member States are evident across all DESI dimensions.

Countries such as Finland, Sweden, the Netherlands, and Germany have consistently maintained scores above the EU average, particularly with regard to:

- the integration of digital technologies in SMEs;
- the use of artificial intelligence in industrial processes;
- advanced digital skills.

By contrast, Romania and Bulgaria have recorded slower progress, especially in the areas of digital skills and business digitalisation.

Table 2. Comparative Trends in Digitalisation (2015 vs. 2024)

Indicator	Western Europe	Central and Eastern Europe
Evolution of DESI score	Steady growth, above EU average	Moderate growth, below EU average
Basic digital skills	Over 60% of the population	Below 40% in some Member States

[13] European Commission, Digital Economy and Society Index (DESI) Reports, Brussels, 2015–2024 editions.

Indicator	Western Europe	Central and Eastern Europe
Integration of AI in companies	Accelerated	Limited
Digital public services	High level of use	Lower level of use

Source: authors' elaboration based on DESI reports, 2015–2024

4.3. The Acceleration of Digitalisation in the Context of the COVID-19 Pandemic

The COVID-19 pandemic acted as a major catalyst for digitalisation. Public health restrictions led to:

- a significant increase in teleworking;
- the digitalisation of public services;
- the acceleration of e-commerce;
- the expanded use of artificial intelligence-based solutions in logistics and healthcare.

Eurostat data indicate that the share of individuals frequently working from home increased substantially in 2020–2021 compared to the pre-pandemic period[14].

However, the capacity for adaptation varied across Member States. Countries with advanced digital infrastructure were able to absorb the economic shock more effectively, whereas economies with lower levels of digitalisation experienced more pronounced labour market disruptions.

4.4. Structural Implications for the Labour Market

The evolution of digitalisation between 2015 and 2025 has generated visible structural effects:

- Increased demand for advanced digital skills;
- Expansion of ICT sectors and data-driven services;
- A decline in the share of routine administrative activities;
- Greater flexibility in forms of work.

In Western Europe, these transformations were accompanied by active reskilling policies. In Central and Eastern Europe, gaps in digital human capital amplified the risks of occupational polarisation.

Thus, the evolution of digitalisation represents not merely a technological process, but a key driver of socio-economic restructuring.

5. The Impact of Digitalisation on the Structure of the Labour Market

5.1. The Reconfiguration of the Occupational Structure

The digital transformation during the period 2015–2025 has led to a significant restructuring of the occupational structure within the European Union. The increased use of digital technologies, automation, and artificial intelligence has influenced the distribution of jobs across skill levels and economic sectors.

Eurostat data indicate a steady increase in employment in:

- the information and communication technology (ICT) sector;
- professional, scientific, and technical services;
- data-driven and software-related activities.

In parallel, occupations characterised by repetitive or administrative tasks have experienced stagnation or relative decline.

This trend confirms the literature on skill-biased technological change and the task-based model[15].

5.2. Skills Polarisation

Skills polarisation represents one of the most widely discussed effects of digitalisation. Across EU Member States, the following trends can be observed:

- an increase in the share of high-skilled occupations;
- the persistence or expansion of low-skilled service-sector occupations;

[14] Eurostat, Employed persons working from home as a percentage of total employment, Luxembourg, 2022.

[15] Daron Acemoglu, David Autor, "Skills, Tasks and Technologies: Implications for Employment and Earnings", în Handbook of Labor Economics, Vol. 4B, Elsevier, Amsterdam, 2011.

- a contraction of the middle-skilled occupational segment.

This phenomenon has previously been documented in developed European economies[16] and continues to persist in the current context of accelerated digitalisation.

Skills polarisation places pressure on the middle class and may lead to widening wage disparities, particularly in the absence of effective reskilling mechanisms.

5.3. Exposure to Automation

The degree of exposure to automation varies across EU Member States. According to OECD analyses, the risk of automation is higher in economies with a large share of standardised manufacturing industries[17].

In Central and Eastern Europe, manufacturing sectors characterised by low value added are more vulnerable to technological substitution. By contrast, Western European economies, which are more diversified and oriented towards advanced services, display relatively lower exposure.

Automation does not necessarily imply the complete disappearance of occupations, but rather the transformation of their content through the reduction of routine tasks and the increasing demand for digital skills.

5.4. Comparative Analysis: Western Europe – Central and Eastern Europe

In Western European Member States, occupational restructuring has been accompanied by active labour market policies and sustained investment in digital skills. In Central and Eastern Europe, the slower pace of reskilling increases the risk of polarisation.

Table 3. Comparative Occupational Trends (2015–2024)

Indicator	Western Europe	Central and Eastern Europe
Growth in ICT occupations	High	Moderate
Decline in routine administrative occupations	Noticeable	Limited
Exposure to automation	Medium	High
Participation in reskilling	Above EU average	Below EU average

Source: authors' elaboration based on Eurostat and OECD data

Thus, the impact of digitalisation on the labour market is not uniform, but rather conditioned by institutional capacity and the level of human capital.

6. Digitalisation and Socio-Economic Inequalities

6.1. The Evolution of Inequalities in the European Union (2015–2025)

The Gini coefficient, used to measure the distribution of disposable income, indicates the persistence of disparities among European Union Member States. During the period under analysis, the average level of inequality in the EU remained relatively stable; however, internal dynamics were heterogeneous.

Nordic and Western European countries maintained lower Gini coefficient values, supported by robust redistributive systems and well-established social policies. By contrast, some Central and Eastern European Member States recorded more pronounced fluctuations, influenced by economic restructuring and labour migration.

Economic literature suggests that technological transformations may amplify inequalities when returns to capital and highly specialised skills increase at a faster rate than average incomes[18].

[16] Maarten Goos, Alan Manning, Anna Salomons, "Job Polarization in Europe", American Economic Review, Vol. 99, No. 2, 2009, pp. 58–63.

[17] Melanie Arntz, Terry Gregory, Ulrich Zierahn, "The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis", OECD Social, Employment and Migration Working Papers No. 189, OECD Publishing, Paris, 2016.

[18] Thomas Piketty, Capital in the Twenty-First Century, Harvard University Press, Cambridge, 2014.

6.2. The Relationship between Digitalisation and the Gini Coefficient

The comparative analysis indicates a complex relationship between the level of digitalisation and income distribution. In highly digitalised economies, productivity growth may generate economic expansion; however, the benefits are not distributed evenly.

The theoretical model of skill-biased technological change suggests that digitalisation tends to favour highly skilled workers, generating higher wage premiums[19].

In the absence of redistributive mechanisms and investment in lifelong learning, this process may lead to:

- widening wage differentials;
- the consolidation of labour market segmentation;
- divergence between urban and rural regions.

Nevertheless, in Member States with effective active policies, digitalisation may coexist with moderate levels of inequality.

6.3. Regional Inequalities and Digital Human Capital

A key aspect of the analysis concerns the territorial distribution of digital human capital. Metropolitan regions in Western Europe concentrate developed technological ecosystems, investments in research and innovation, and employment opportunities in high value-added sectors.

By contrast, rural areas or regions dependent on traditional industries tend to display:

- low levels of digital skills;
- limited access to training;
- high exposure to automation.

The World Bank emphasises that the digital economy can generate "digital dividends" only in the presence of an adequate institutional framework and sustained investment in human capital[20].

6.4. The Role of Lifelong Learning in Reducing Polarisation

Adult participation in lifelong learning represents a key factor in mitigating the negative effects of digitalisation on inequalities.

OECD data indicate that individuals with higher levels of educational attainment participate to a significantly greater extent in continuing training programmes[21]. This phenomenon creates a cumulative advantage mechanism, whereby individuals already integrated into the dynamic segments of the labour market further consolidate their position.

In Member States where participation in training is high, skills polarisation is mitigated and professional mobility is more pronounced.

Therefore, the relationship between digitalisation and inequality is not deterministic, but mediated by:

- investment in education;
- the effectiveness of active labour market policies;
- institutional capacity;
- social protection systems.

7. Public Policy Implications and Strategic Directions

7.1. Active Labour Market Policies in the Digital Era

Digital transformation requires the adaptation of active labour market policies (ALMPs) to new technological realities. Automation and occupational restructuring call for flexible public intervention mechanisms aimed at preventing structural unemployment and facilitating professional mobility.

[19] Daron Acemoglu, David Autor, "Skills, Tasks and Technologies: Implications for Employment and Earnings", în Handbook of Labor Economics, Vol. 4B, Elsevier, Amsterdam, 2011.

[20] World Bank, World Development Report 2016: Digital Dividends, World Bank, Washington D.C., 2016.

[21] OECD, Skills Outlook 2021: Learning for Life, OECD Publishing, Paris, 2021.

The OECD emphasises that effective active policies reduce the risk of exclusion for workers exposed to automation and enhance their capacity for labour market reintegration[22]. Career guidance programmes, training subsidies, and incentives for occupational transition into digital sectors become essential instruments.

In Member States where such policies are insufficiently developed, digitalisation may intensify labour market segmentation and the precarisation of certain socio-professional groups.

7.2. Lifelong Learning and Digital Reskilling

A central component of an inclusive digital transition is the strengthening of lifelong learning systems. The European Skills Agenda highlights the need to increase adult participation in continuing vocational education and training[23].

Digital reskilling and upskilling are essential for:

- reducing the risk of automation;
- enhancing workforce adaptability;
- facilitating occupational mobility.

At the same time, investment in STEM education and basic digital skills contributes to reducing the digital divide between regions and social groups.

7.3. The Regulation of Artificial Intelligence and Worker Protection

The adoption of the Artificial Intelligence Act at the level of the European Union marks a significant milestone in regulating the use of AI[24]. The regulatory framework aims to reduce the risks associated with automated systems, including those arising in the field of employment.

In parallel, the European Commission has introduced measures to improve working conditions in the platform economy[25]. These initiatives seek to:

- clarify the employment status of platform workers;
- ensure adequate social protection;
- prevent algorithmic discrimination.

The appropriate regulation of artificial intelligence and the platform economy is essential to preventing the widening of inequalities generated by digitalisation.

7.4. Digital Cohesion and European Convergence

Digitalization can become a driver of economic convergence only if it is accompanied by balanced investment in infrastructure and human capital. The EU's Recovery and Resilience Facility allocates substantial resources to the digital transition, including for skills development and the modernisation of public administration[26].

For Central and Eastern European Member States, the effective use of these funds represents a strategic opportunity to reduce the digital gap.

An inclusive digital transition requires:

- investment in education and skills;
- the reduction of regional disparities;
- the strengthening of social protection systems;
- the promotion of responsible innovation.

Thus, public policies become the determining factor in transforming digitalisation from a driver of polarisation into an instrument of socio-economic cohesion.

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[22] OECD, Employment Outlook 2019: The Future of Work, OECD Publishing, Paris, 2019.

[23] European Commission, European Skills Agenda for Sustainable Competitiveness, Social Fairness and Resilience, Brussels, 2020.

[24] European Parliament and Council of the European Union, Regulation (EU) 2024/1689 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act), Official Journal of the European Union, 2024.

[25] European Commission, Proposal for a Directive on improving working conditions in platform work, Brussels, 2021.

[26] European Commission, Recovery and Resilience Facility Regulation (EU) 2021/241, Official Journal of the European Union, 2021.

8. Conclusions

The present research has examined the impact of digitalisation and artificial intelligence on the labour market and socio-economic inequalities in the European Union during the period 2015–2025, drawing on a conceptual model that correlates the level of digitalisation, occupational restructuring, and income distribution.

The comparative analysis shows that Member States with higher levels of digitalisation record a greater share of high-skilled occupations and a more accelerated integration of digital technologies into the economy. Digital transformation is associated with the expansion of knowledge-based sectors and with increasing demand for advanced digital skills.

At the same time, the findings confirm the existence of a trend towards skills polarisation, characterised by the simultaneous growth of high-skilled and low-skilled occupational segments, alongside the decline of middle-skilled occupations. This development reflects the dynamics of skill-biased technological change and helps explain the pressures exerted on the middle class in several Member States.

Regarding the relationship between digitalisation and socio-economic inequalities, the analysis indicates that the effects are not uniform. In countries with high participation in lifelong learning and well-developed active labour market policies, the impact of polarisation is mitigated. By contrast, in economies with low levels of digital human capital and limited technological infrastructure, digitalisation may intensify labour market fragmentation and income disparities.

The differences between Western Europe and Central and Eastern Europe are largely explained by gaps in digital skills, investment in innovation, and institutional efficiency. Countries that have consistently invested in education, the digitalisation of public services, and professional reskilling have been able to transform the digital transition into a driver of competitiveness and economic convergence.

Therefore, digitalisation and artificial intelligence generate ambivalent effects: they stimulate productivity and innovation, yet may amplify occupational polarisation in the absence of adequate public policies. The relationship between digital transformation and inequality is mediated by institutional, educational, and redistributive factors.

An inclusive digital transition at the level of the European Union requires:

- strengthening digital competences at all levels of education;
- expanding reskilling programmes and lifelong learning systems;
- reducing regional disparities through investment in digital infrastructure;
- adapting social protection systems to new forms of work;
- ensuring the responsible regulation of artificial intelligence.

In conclusion, digitalisation does not inevitably lead to rising inequalities; however, in the absence of coherent strategic interventions, it may become a driver of socio-economic divergence within the European Union. The capacity of Member States to manage this transition will shape the future level of European cohesion and convergence.

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