Regional job creation and destruction across industries in Europe in the context of the green and digital transitions

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Extended Abstract

The green and digital transitions are transforming national and regional economies across Europe. Efforts to decarbonize energy systems, digitize production processes, and redesign value chains are changing industrial structures and regional labor markets. Jobs are being created and lost across different regions and industries, although the speed and extent of these changes vary by location and sector.

Climate change adaptation requires reducing dependence on fossil fuels, which impacts regions reliant on coal. The EU aims for a 55% reduction in greenhouse gas emissions by 2030, 90% by 2040, and carbon-neutral production by 2050. These ambitious targets call for significant socio-economic changes, especially in regions dependent on fossil fuels, presenting a major challenge for coal-dependent labor markets. As these effects are industry-specific, they have regional implications. For example, reducing reliance on fossil fuels is complex, given the concentration of the coal industry in specific EU regions—at least one coal-fired power plant remains in 103 EU NUTS2 regions, and 41 regions still operated coal mines into the late 2010s. Accordingly, industry and geography are closely linked, highlighting the importance of regional industrial structures for the uneven development of Job Creation and Destruction (JCD). Industries at risk of declining demand due to decarbonization policies include coal and lignite mining; manufacturing of coke and refined petroleum products; chemical manufacturing; basic metals production; sewerage; and air transport. Conversely, sectors with likely increased demand involve crop and animal production; forestry and logging; fishing and aquaculture; residential and non-residential building construction; and warehousing and transportation support activities.

The digital transition accompanies the greening of the economy and reshapes labor markets by creating jobs and eliminating others, while transforming the nature of production and work more broadly. Technological innovations like digitization and generative artificial intelligence (AI) have significant implications for employment. Although they affect nearly all sectors, the impacts of the digital transition on the labor market are not evenly distributed across industries and regions, with important implications for inequality. Industries seeing increased demand include programming, broadcasting, telecommunication, computer programming, consulting, and related activities, as well as scientific research and development. Conversely, in the context of digital transition, automation and AI tend to replace routine tasks, impacting industries such as retail trade, financial services, legal and accounting activities, and office administration and support services, which are experiencing declining demand. Although the impacts of the digital transition are less industry-specific than those of the green transition, altering the core of work mode, efforts to digitize production affect labour markets in regions specialized in the above sectors. Moreover, the implications of the digital transition for employment vary further across space, with regions with a high rate of manual work on routine tasks being largely affected.

The JCD process accelerated by macro drivers also leads to job reallocation across industries and regions. Shifts in employment are typically characterized by job

movements from declining industries, such as coal mining and chemicals, to expanding sectors, such as high-tech manufacturing, IT, or pharmaceuticals. Thus, labour markets in regions where these growing industries concentrate are expected to expand, whereas those that host declining sectors are expected to contract, including old industrial regions.

Studies on the JCD process have analyzed the transformation of labour markets during the current transitionary period. However, the largest body of literature on JCD and its effects focuses on the national level. Most scholars have examined the processes of work transformation, particularly JCD, at the national level. Therefore, they largely overlook smaller-scale geographical variation due to the regionally specific socio-economic context. Moreover, they miss the opportunity to highlight regional labour markets' adaptation to the transition-driven JCD and reveal a gap in understanding its socially and geographically uneven implications. Only a few studies adopt a regional perspective in the study of JCD. However, the evidence base remains fragmented and geographically skewed. Most studies focus on individual regions or countries, specific technologies or isolated policy instruments, while comprehensive multi-country, multi-regional analyses are rare. Others have also studied the regional process of JCD, focusing only on at-risk sectors and specific regions, and particularly from a green transition perspective, thus providing a narrow picture of JCD. While attention to these regions and sectors is of great importance, there is a need for comprehensive, holistic studies across all regions and sectors, understanding the interconnections among different industries within complex global production networks and value chains, and analysing how transitions disproportionately affect different regions and industries. Indeed, there is an evident gap in studies of local labour market trends in the context of the green and digital transitions, providing socially and geographically sensitive insights that are crucial to contemporary socio-economic transformation.

Moreover, because most studies fail to grasp the geographical nature of the JCD process, they fall short of offering place-based, bottom-up, and geographically specific solutions for just green and digital transitions in local labour markets, ensuring that no region or socio-economic group is left behind during job reallocation across industries and regions. Despite efforts to align education with labour market needs, persistent skill shortages call for urgent reskilling and upskilling policies. Previous policies focused on enhancing youth employability through vocational education and training, but they overlooked the costs of excess human capital. Reskilling and upskilling strategies are becoming increasingly crucial in light of recent developments, such as the 'Great Resignation,' underscoring the importance of workers' expectations in the transition.

This paper analyzes the geographically uneven effects of job creation and destruction in the context of the green and digital transitions across industries and European regions. It presents findings of the ISABEL project (https://isabelproject.eu/) on the JCD procedure in the context of the green and digital transitions.

At the European scale, to address the crucial challenge of data scarcity, the paper adopts several strategies to create a dataset capable of mapping the JCD process across European regions. The main data source is the Competitiveness Research Network (CompNet), which provides data for job creation and job destruction rates at the EU NUTS2 level for many EU countries from the early 2000s to the early 2020s. CompNet is a network organization of the European System of Central Banks and sets the groundwork for high-quality research on economic competitiveness and productivity. It regularly updates its competitiveness dataset for European countries using microdata, providing unprecedented coverage and comparability across countries. To address missing data, we contacted national statistical offices and ministries of labour to obtain

JCD figures. In this process, this study accounted for the complexity of the relationships between job creation and hiring, and job destruction and separation, in terms of whether they were treated as job replacements. Related to this, the CompNet database circumvents the issue of hirings and separations, including replacements, by reporting on companies that grow or decline in employment, thereby capturing the real dynamics and evolution of job creation and/or job destruction.

Detailed indicators on JCD at the regional and industry level are created. By combining different statistical sources to estimate JCD figures, this paper analyzes job creation, job destruction, and gross employment growth in the European Union NUTS2 regions (plus the United Kingdom and Serbia) by industry at the NACE 2-digit level since the early-2010s. The findings provide a deeper, more comprehensive understanding of the contemporary process of job creation and destruction, which intensifies in the context of the green and digital transitions, and of how this process develops unevenly across regions and industries.

Keywords: job creation, job destruction, green transition, digital transition, European regions