Sinthesis of Project PRIN 2022 "The geography and economics of new technological transformations-related jobs in Italy"

The effects of the advent of a plurality of new technologies in the labour market are still a source of controversy. Some scholars attribute to technology a factor augmenting nature, increasing productivity, demand for labour and therefore employment and wages (Acemoglou and Restrepo, 2019). Others stress instead the substitution nature of capital with labour, which leads to the harbinger of widespread joblessness (Brynjolfsson and McAfee, 2014). The literature is rich of empirical studies aiming at measuring the real effects of job displacement, especially for what concerns the adoption of robotisation. To our knowledge, however, very few studies exist on the effects of digitalisation and of other technologies of industry 4.0 (4IR) on labor markets. In particular, digitalisation, advocated by the PNRR in the digital transition towards a modern society and economy, is a multifaceted phenomenon, made of a sprawling range of activities based on digital platforms, and capable of redesigning the boundaries of manufacturing products towards services. At the same time, 4IR technologies are at the core of very profound changes in the manufacturing sector, a restructuing process that, also in Italy, has been shaped by important policy interventions. These technological advances will inevitably impact on jobs and change the skills, competences and tasks required on the labour market.
Despite the large interest in this field, two main aspects remain overlooked and this project aims to address them. Firstly, this project will provide novel evidence and mapping of the geography of technological transformationsin NUTS3 regions in Italy, thereby adding to those contributions focusing only on the potential impact of general characterizations of technological innovations, rather than on the actual adoption of specific technologies. Secondly, the impact of these transformations on local labour market dynamics will be assessed in terms of lovely (more required) and lousy (displaced) jobs (as defined by Goos and Manning 2007) generated by the technological transformations in the different geographical contexts, an aspect that is still to be measured. All this would allow the identification of which tasks, occupations and activities do have a comparative advantage relative to machines and other technological advances, thereby providing evidence on the reinstatement effects that directly counterbalance the displacement effects that the technological progress creates (Acemoglu and Autor, 2011). Knowing where and under which technological transformation such changes take place is of primary importance for a spatially equal transition towards modern, digitalised economy and society. The analysis will also shed light on a number of relevant politcy issues that can inform labour-related policies, in particular on the aspects associated with the emergence of lovely and lousy jobs brought about by the digital transition and other technologies of industry 4.0.

In a nutshell, this project aims at bridging various strands of the literature by exploiting the cross-regional variation in the actual adoption of new technologies in Italy to identify lovely and lousy jobs and, accordingly, to learn more about the local overall exposure to such technologies and the related employment dynamics in the Italian provces. The main aim is to identify which jobs are expanded by the adoption of new technologies (lovely jobs), and which jobs are instead displaced (lousy jobs) by new machines. This opens to important reflections on how the digital transition should be accompanied to mitigate the effects on and exploit available opportunities for local labour markets.

To achieve its aim, the project is organized around two main subsequent steps, developed one in each year of the project, with clear objectives for each year (Figure 1).

In the first year, the two research units will be in charge of the identification, measurement and mapping of the different technological transformations in NUTS3 regions in Italy, as well as of their composition in terms of jobs. The UNITN unit will build a cross-sectional regional database containing information on Italian firms' adoption of robots and other 4IR technologies. Moreover, it will create a detailed longitudinal database on the evolution of local labour markets, in terms of tasks and occupations in different sectors. This effort will allow to create a map of the adoption of robotization and other 4IR technologies by Italian manufacturing companies in the recent period, as well as of the local labour market dynamics.

In the second year, the project will aim to measure the effects of the technological transformations on the local labour markets, through the identification of lovely (created) and lousy (displaced) jobs by each technology. To estimate the effects of the local exposure to robots and other 4IR technologies on the Italian local employment dynamics, the UNITN research unit will use the approach developed by Acemoglu and Restrepo (2020), thereby regressing employment dynamics on the measures of adoptions of technologies. Identification will exploit the cross-regional variation in the series, and potential endogeneity problems will be addressed by means of novel instrumental variables connected with patents. Once lovely (created) and lousy (displaced) jobs will be identified, maps of the local exposure to the technologies will be created.

Based on the results from the empirical analysis, both Units will develop policy suggestions to mitigate any adverse societal impact of technological progress and to boost its positive contribution to economic growth.
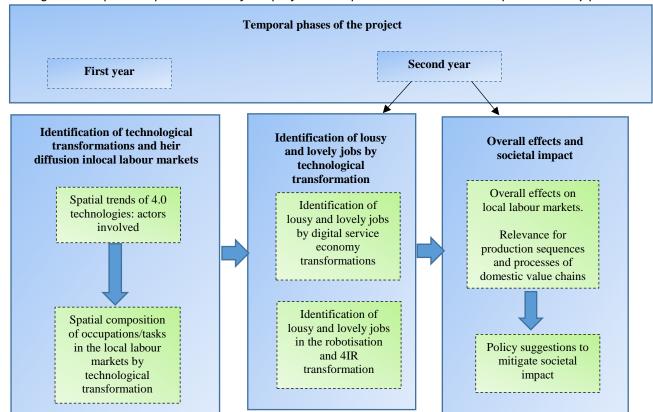
Figure 1 Graphical representation of the project's components and their interdependencies by phases