Skill relatedness and the green transition of European regions

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Extended abstract

The digital and green twin transitions have been in the core of EU policy agenda especially since the COVID-19 pandemic. Many studies on twin transitions have focused on the technological capabilities that are relevant for the twin transitions (Bachtrögler-Unger et al., 2023; Montresor and Vezzani, 2023; Santoalha et al., 2021). However, these studies provided limited implications for further understanding whether the twin transition is also a just transition that provide good job opportunities for achieving inclusive growth (Directorate-General for Research and Innovation (European Commission) et al., 2023). A focus on jobs and skills is therefore important for better understanding the directionality of the twin transitions.

Recent studies on green jobs have applied the task-based approach in categorizing the jobs into green and non-green jobs based on the intensity of green tasks in each occupation (Vona, 2021) and compared the green jobs with other jobs in terms skill requirements and wages (Saussay et al., 2022). Although this approach avoided defining green jobs at the occupation level, it failed to capture the complementarity between non-green tasks and green tasks. This is especially important in understanding the twin transitions that many digital skills are expected to play important role in facilitating the further penetration of clean energy technologies to achieve the net-zero goal (Popp et al., 2022).

Evolutionary economic geography literature has focused on the relatedness between different technologies and industries (Boschma, 2017; Hidalgo, 2021). Recent studies on regional labor market have further considered the relatedness between jobs and skills consists of two elements: similarity and complementarity (Alabdulkareem et al., 2018; Farinha et al., 2019; Hong et al., 2020; Moro et al., 2021). However, the majority of these studies are based on the US context using O*NET data.

To overcome the gaps in existing literature, this paper links green patents with the European classification of skills, competences, qualifications and occupations (ESCO) based on the semantic similarities using recent natural language processing methods. Doing so, we will be able to capture a broader set of skills that are related to the green transition. This is especially important because many non-green skills including many digital skills are expected to play an important role in facilitating further penetration of clean energy technologies to achieve the net-zero goal. Furthermore, this paper constructs the skill space which captures the complementarity between any given pair of skills. Following Alabdulkareem et al (2018), this paper calculated the skill complementarity indicator based on the co-occurrence of skills at the occupation level using the relational table between skills and occupations in the ESCO classification. Doing so, we could capture a broader set of skills that are related to the skills that are important for the green transitions, especially the digital skills that are complementary to the green skills using the tag for digital skills in the ESCO classification.

Furthermore, this paper combines data from the European Labor Force Survey and the online job advertisement data provided by the European Centre for the Development of Vocational Training (CEFEDOP) to calculate the availability of green skills, and related digital skills for European regions. This comprehensive mapping of the interconnected skill capabilities for the digital and green twin transitions at the European regional level can provide important insights for policies that aimed at promoting sustainable, digital and inclusive development.

References

Alabdulkareem, A., Frank, M.R., Sun, L., AlShebli, B., Hidalgo, C., Rahwan, I., 2018. Unpacking the polarization of workplace skills. Science Advances 4, eaao6030. https://doi.org/10.1126/sciadv.aao6030

Bachtrögler-Unger, J., Balland, P.-A., Boschma, R., Schwab, T., 2023. Technological Capabilities and the Twin Transition in Europe. Opportunities for Regional Collaboration and Economic Cohesion. WIFO Studies.

Boschma, R., 2017. Relatedness as driver of regional diversification: a research agenda. Regional Studies 51, 351–364. https://doi.org/10.1080/00343404.2016.1254767

Directorate-General for Research and Innovation (European Commission), Stres, Š., Gołębiowska-Tataj, D., Walz, R., Dixson-Declève, S., Schwaag Serger, S., Balland, P.-A., Isaksson, D., Martins, F., Dunlop, K., Renda, A., Charveriat, C., Mir Roca, M., Pedersen, G., Soete, L., Huang, A., Christophilopoulos, E., 2023. Industry 5.0 and the future of work: making Europe the centre of gravity for future good quality jobs. Publications Office of the European Union, LU.

Farinha, T., Balland, P.-A., Morrison, A., Boschma, R., 2019. What drives the geography of jobs in the US? Unpacking relatedness. Industry and Innovation 26, 988–1022. https://doi.org/10.1080/13662716.2019.1591940

Hidalgo, C.A., 2021. Economic complexity theory and applications. Nature Reviews Physics 3, 92–113. https://doi.org/10.1038/s42254-020-00275-1

Hong, I., Frank, M.R., Rahwan, I., Jung, W.-S., Youn, H., 2020. The universal pathway to innovative urban economies. Science Advances 6, eaba4934. https://doi.org/10.1126/sciadv.aba4934

Montresor, S., Vezzani, A., 2023. Digital technologies and eco-innovation. Evidence of the twin transition from Italian firms. Industry and Innovation 0, 1–35. https://doi.org/10.1080/13662716.2023.2213179

Moro, E., Frank, M.R., Pentland, A., Rutherford, A., Cebrian, M., Rahwan, I., 2021. Universal resilience patterns in labor markets. Nat Commun 12, 1972. https://doi.org/10.1038/s41467-021-22086-3

Popp, D., Vona, F., Grégoire-Zawilski, M., Marin, G., 2022. The Next Wave of Energy Innovation: Which Technologies? Which Skills?

Santoalha, A., Consoli, D., Castellacci, F., 2021. Digital skills, relatedness and green diversification: A study of European regions. Research Policy 50, 104340. https://doi.org/10.1016/j.respol.2021.104340

Saussay, A., Sato, M., Vona, F., O'Kane, L., 2022. Who's fit for the low-carbon transition?: Emerging skills and wage gaps in job and data.

Vona, F., 2021. Labour markets and the green transition: a practitioner's guide to the task based approach, in: JRC. Publications Office of the European Union, Luxmbourg.