

Occupations and skills for the digital transitions: a forecast of recruitment difficulties in an Italian region

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Outline

1. Introduction and problem statement
2. Research questions
3. Data
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1. Introduction and problem statement

- As European countries prepare for the **digital transition**, their workforce must have the relevant skills to be part of this change (Cedefop, 2023, OECD, 2023).
- However, in recent years the **difficulties in filling vacancies** have grown consistently in some countries, and companies complain of difficulties in finding the required figures (European Commission, 2023).
- **Italy** has long suffered from the problem of **mismatch** between labour demand and supply and the difficulties have increased dramatically in the post-pandemic period, for reasons relating both to the scarcity of candidates and the quality of their skills.

2. Research questions

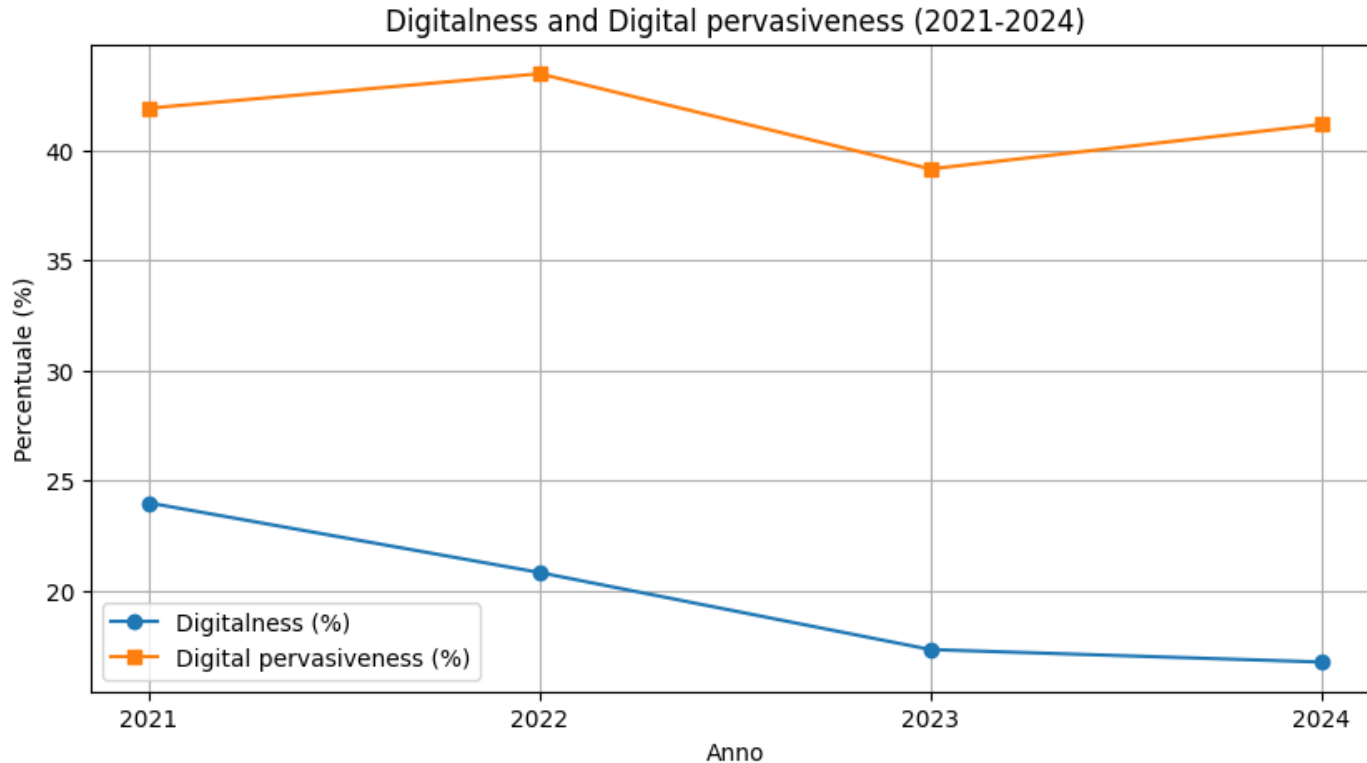
Given the importance of a skilled workforce for the success of the digital transition and the recent increase in mismatch in the Italian labour market, this contribution aims to:

- a) analyze recent trends and features of labour demand for digital occupations and skills in an Italian region (Tuscany);
- b) identify recent trends in hiring difficulties;
- c) identify the occupations and skills that will be the most difficult to find in the near future using machine learning techniques to make a forecast.

3. Data

- **Lightcast data:**
 - 957,000 job postings in Tuscany from 2014 to february 2025;
 - total of 4,452,944 skills associated with these postings (Lightcast skills, 33k possible skills).
- **Excelsior:** percentage of hard-to-fill positions by year, occupation and reasons of difficulty, 2021–2024.

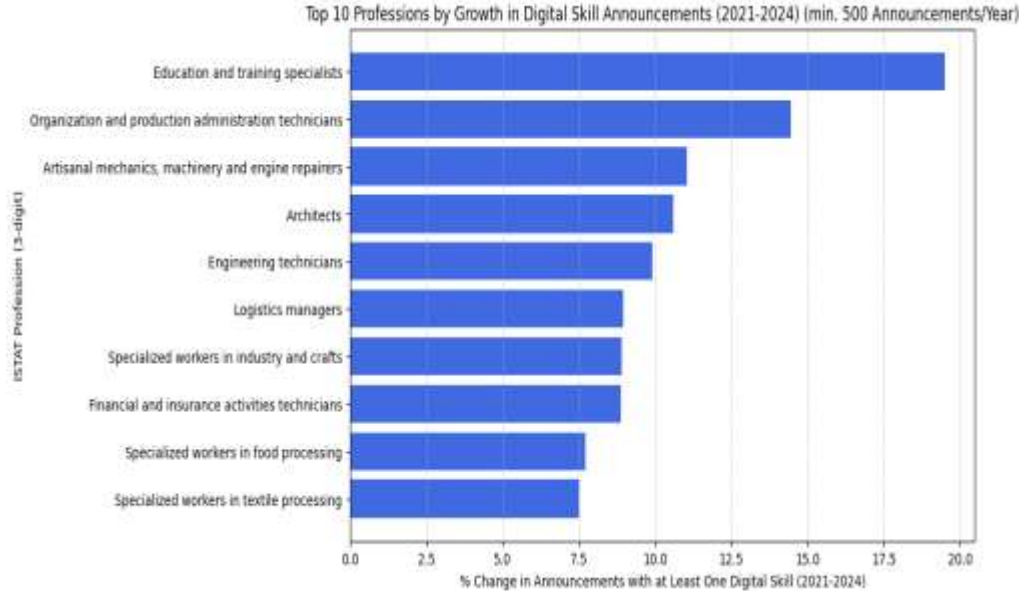
4. Descriptives: digital skills and digital jobs



The decrease in digitalness is the effect of:

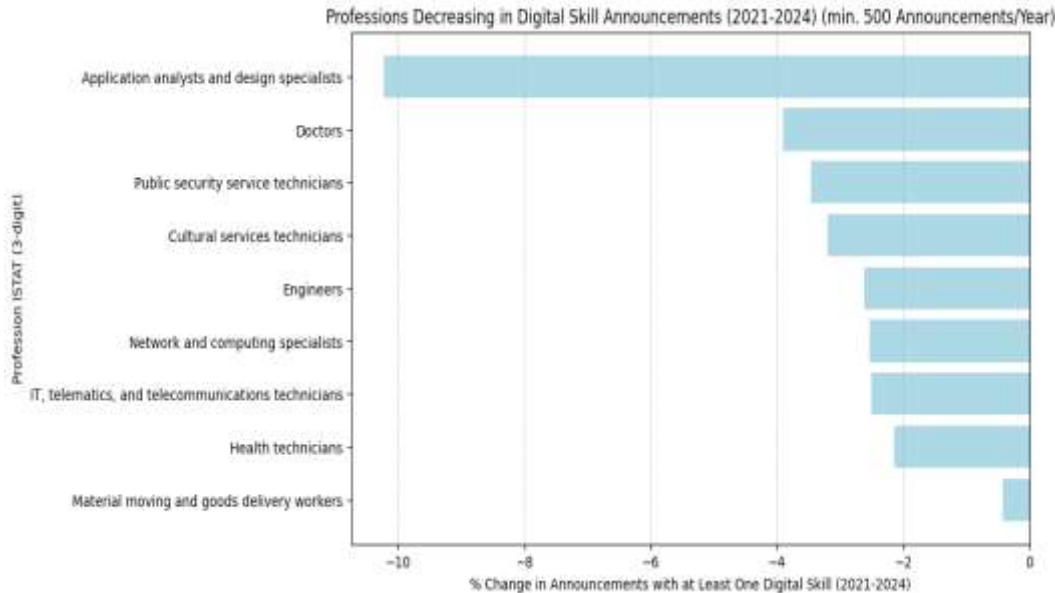
- Increasing number of skills requested per posting;
- Increasing coverage of labour market in terms of sectors.

4. Descriptives: digital skills and digital jobs



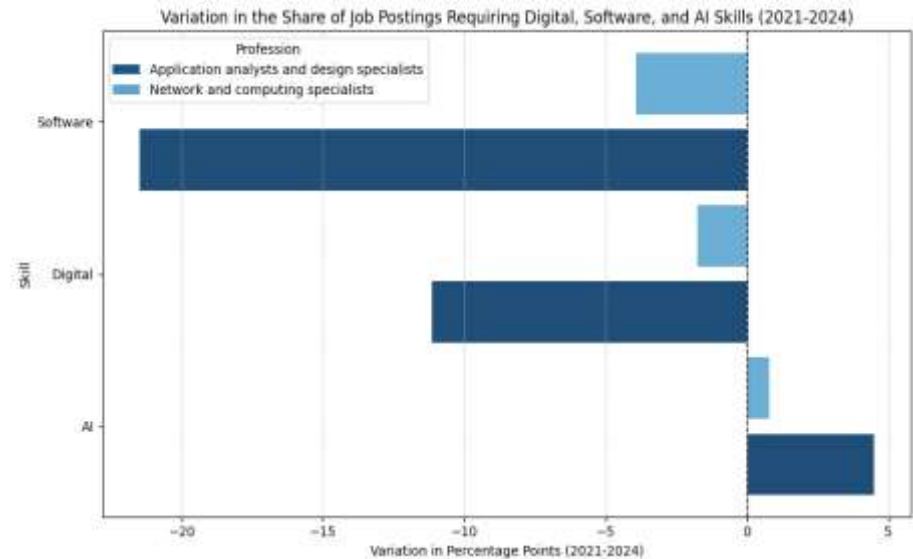
Basic digital skills are becoming increasingly important across all job types.

4. Descriptives: digital skills and digital jobs



Complementary transversal skills are obtaining importance for digital jobs.

The demand for digital skills has decreased for digital jobs, with the exception of AI skills.



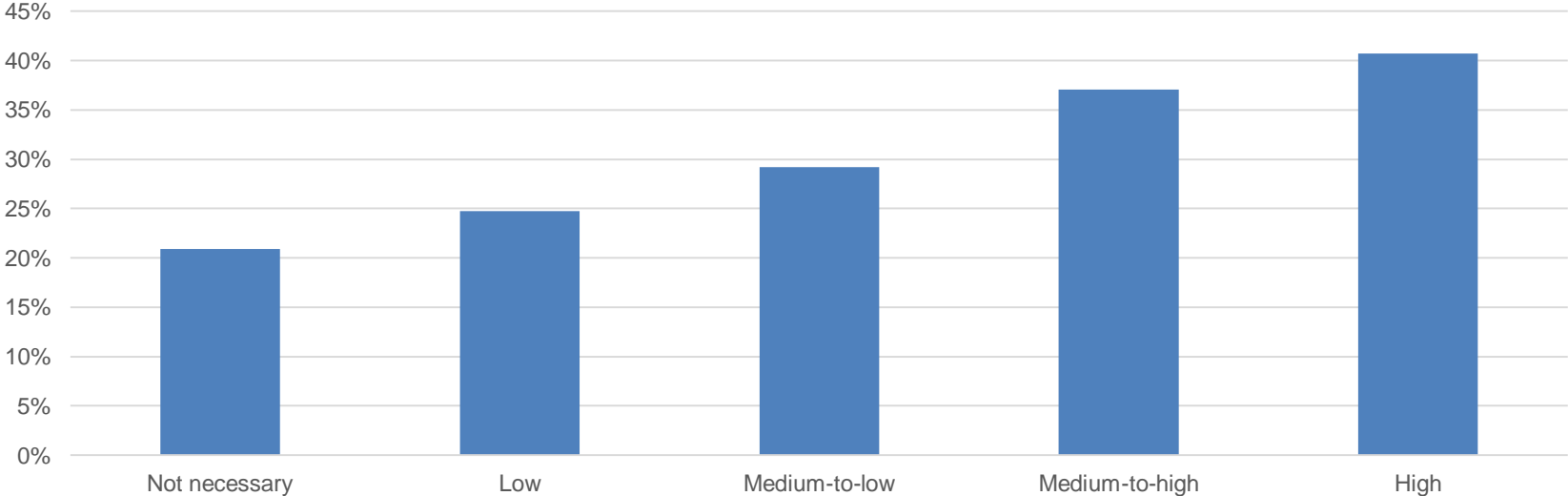
4. Descriptives: recruitment difficulties



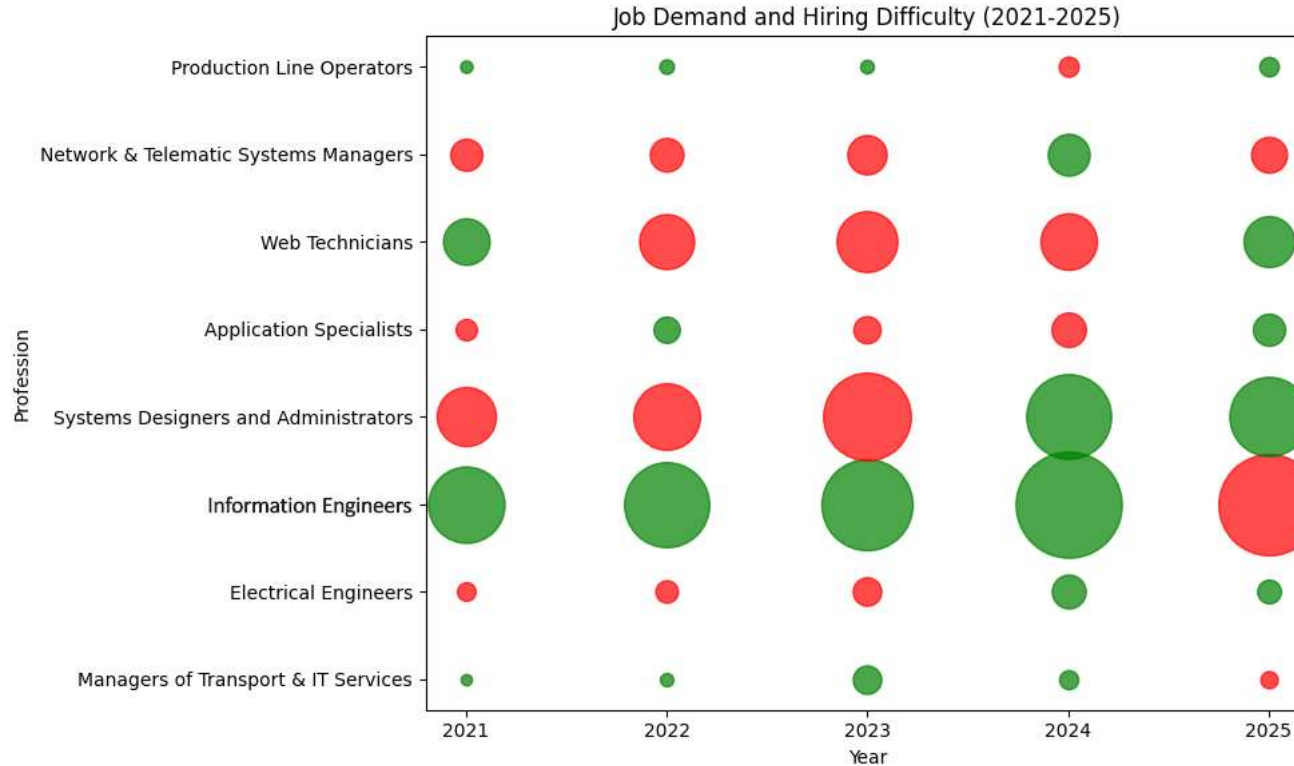
Over time, the proportion of hard-to-fill positions has grown significantly—from 36% in 2021 to over 50% in 2024—with a large part of these vacancies due to the inadequacy of the candidates.

4. Descriptives: recruitment difficulties

Percentage of difficult hirings due to inadequacy of candidates, by level of digital skills requested. 2024



5. Results of the model



Some examples of the model's results focus on jobs with the highest share of digital skills relative to the total number of unique skills required for the profession.

6. Discussion and open questions

Strengths of the Analysis:

- merging Lightcast data with hiring difficulties.

Limitations of the Analysis:

- limited data on salary and required experience;
- data coverage and representativeness in Tuscany.

Proposals for future research:

- integration of additional regional datasets;
- expansion of model variables.

Thanks for your attention

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