

Labour Market Dynamics in the Tourism Sector: Professional Trends and Emerging Skill Requirements

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Agenda

- 1 Brief introduction to the role of the gender equality in the recruitment process
- 2 **Methods:** Three-way data and Weighted Factor Analysis with gender as supplementary and stratification variable
- 3 Application and results
- 4 Summary and Conclusions

Motivation

The issue of gender equality in Labour Market represents one of the most controversial and actual topics debated during last years within the category of the gender studies.

Many sources of inequality can be related to the Labour Market both in demand and supply:

- Gender Pay Gap (Bishu and Alkadry, 2017; Blau and Khan, 2000 and 2003)
- Welfare system in Gender Gap (Castellano and Rocca, 2020; Kahn et al., 2014)
- Gender Gap in early-career (Bertrand et al., 2010, Manning and Swaffield, 2008)
- Gender Gap across territorial issues (Castellano and Rocca, 2014; Anxo et al., 2006)

This contribution is focused on the role of the soft skills as source of gender inequality. The hypothesis is to verify, given the same job offer, the difference in terms of set of soft competencies requested across gender.

Why the relationship between gender and soft skills?

Skills are playing a key role in improving the competitiveness of businesses and employees, reshaping compensation structures.

In an innovation-driven environment, soft skills emerge as a response to the challenge of change, essential for mitigating the risk of skill obsolescence.

Analyzing the relationship between the recruitment process and the required skills is critical regardless the gender, therefore the investigation of possible gender disparities represents a further element of complexity.

The main aim of this contribution is to detect potential inequalities in requested soft skills for candidates hired in a specific segment of Labour Market, the tourism sector.

The AdeccoGroup database

- The dataset used in this work was extracted from the database AdeccoGroup for 9 years (2016-2024). In particular, the statistical unit is represented by candidates awarding the job offers and the explanatory variables are the requested soft skills to pass the recruitment process.
- Job positions are comparable using the ESCO international classification. Informations about job offers generates knowledge about criteria used for the choice of the best candidate.
- During the observed period, the job positions are more than 1,500,000 divided into 9 industries: IT & Digital, Engineering, Medical, Finance, **Tourism**, HR, Commercial, Food Services and Production.

Esco job definitions for tourism sector

The Tourism jobs profiles analyzed are four, as the European Skills, Competences, Qualifications and Occupations (ESCO) definition:

- **Airport maintenance technicians** (Code 3119.1): they are in charge of the maintenance of all equipment necessary for ensuring the functionality of the airport, for example, visual aids, airport electrical systems, luggage systems, security systems, pavements, drainage, and maintenance of unpaved areas;
- **Activity leaders** (Code 3423.1): they provide recreational services to people and children on vacation. They organise activities such as games for children, sport competitions, cycling tours, shows and museum visits. Recreational animators also advertise their activities, manage the available budget for each event;
- **Travel consultants and clerks** (Code 4221): they provide information about travel destinations, arrange travel itineraries, obtain travel and accommodation reservations and register passengers at check-in and departure;
- **Transport clerks** (Code 4323): keep records of operational aspects and coordinate the timing of train, road and air passenger and freight transport, and prepare reports for management.

Professional figures for Tourism sector (2016-2024)

The total number of professional offers hired in the tourism sector that include soft skills requirements is equal to 4,829. About gender, the final dataset consists of 46% women and 54% men.

Professional figures (%)	2016	2017	2018	2019	2020	2021	2022	2023	2024
Airport maintenance technician	17.1	17.6	43.4	8.2	26.5	23.7	<u>42.4</u>	<u>43.0</u>	<u>50.8</u>
Activity leader	4.6	1.2	1.3	5.2	3.8	7.9	2.9	1.5	1.1
Travel consultants and clerks	<u>71.8</u>	<u>73.4</u>	<u>59.8</u>	<u>54.2</u>	15.0	11.5	<u>42.9</u>	<u>40.2</u>	<u>38.3</u>
Transport clerks	6.5	4.8	4.1	23.5	<u>41.4</u>	<u>56.8</u>	11.4	10.1	8.8
	100.0	96.9	99.6	91.0	76.7	100.0	99.5	94.8	99.1

Women are more present as Travel consultants and clerks and Activity leaders. Men are more frequently hired as Airport maintenance technicians and Transport clerks.

Multi-dimensional data

This study uses a dataset of over one and a half million job placements across the main macro-sectors in Italy from 2016 to 2024. Data have a three-way structure forming a multivariate time array represented as X_{ijt} :

- i denotes a statistical unit (i.e., a job profile)
- j represents one of the required skills
- t indicates an occasion (i.e., a year)

The observed values of the J variables on all I units in t are selected from the multivariate time array X_{ijt} , thus obtaining a matrix which is called 'frontal slice' (D'Urso and Vichi, 1998).

$$X^{(t)} = \begin{bmatrix} x_{1j}^{(t)} & x_{2j}^{(t)} & \cdots & x_{Jj}^{(t)} \\ \vdots & \vdots & \ddots & \vdots \\ x_{1J}^{(t)} & x_{2J}^{(t)} & \cdots & x_{JJ}^{(t)} \end{bmatrix}$$

From multidimensional data to time trajectories

Slices are stacked on top of each other to obtain the matrix with IT rows and J columns.

The matrix displaying the time trajectory of job profile i is obtained by selecting the J -dimensional vectors

$$\text{Time trajectory } \mathbf{X}_i = \begin{bmatrix} x_{i1}^{(1)} & x_{i2}^{(1)} & \cdots & x_{iJ}^{(1)} \\ x_{i1}^{(2)} & x_{i2}^{(2)} & \cdots & x_{iJ}^{(2)} \\ \vdots & \vdots & \ddots & \vdots \\ x_{i1}^{(T)} & x_{i2}^{(T)} & \cdots & x_{iJ}^{(T)} \end{bmatrix}$$

To compare the time trajectories and to reduce the number of variables, the Weighted Factorial Analysis (WFA) can be used.

The distribution of units at each time point can be visualized in the space defined by the first two principal components (Carlier, 1986; D'Urso and Vichi, 1998).

Time trajectories and gender as supplementary variable

The dynamic trajectory of each unit can be represented by connecting the points across the different years (Coppi and D'Urso, 2001; Liberati and Mariani, 2012).

The novel contribution of this study has been represented by the introduction of gender variable as supplementary variable in the model.

The supplementary variables are excluded by the phase of extraction of the factors and only successively, they are used by considering their position on the Cartesian plane as auxiliary interpretation for the analysis (Abdi and Williams, 2010).

Furthermore, gender information has been used as stratification variable in order to detect possible disparities in the recruitment process.

Application of Weighted Factor Analysis (WFA)

For the tourism industry, 6 most frequent soft skills have been selected among 26 skills included in the AdeccoGroup competence dictionary.

Using the proposed dataset, let $I = 4$ the number of professional roles, let $J = 6$ the number of soft skills and $T = 9$ years from 2016 to 2024.

The application of the Weighted Factor Analysis (WFA) allows to achieve 5 possible evidences:

- 1 Similarities between job figures of the same industry
- 2 Individuation of cluster of soft skills
- 3 Association of professional roles with some specific soft skill
- 4 Evolution of the job figures using the time trajectories
- 5 Association between soft skills and supplementary variables

Principal results by WFA

The Weighted Factor Analysis has been conducted on the relative frequency distribution of 6 soft skills for each year and professional figure, while the weight is represented by the number of the job offers in order to detect 2 latent components grouping the soft skills.

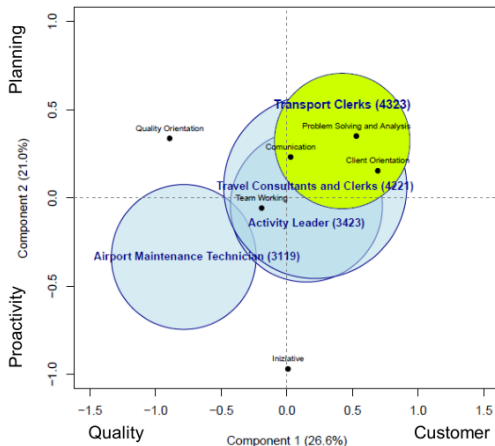
Soft skills	Factor 1	Factor 2
Quality orientation	−0.893	0.338
Problem Solving and analysis	0.529	0.351
Client orientation	0.692	0.154
Initiative	0.010	−0.969
Communication	0.030	0.233
Team working	−0.193	−0.060
Explained variance	26,6%	21,0%

A static representation

A bubble graph represents a static point of view only based on the barycentre of the professional figures not taking into account the trend of the entire time-series.

Evidences from static analysis

- Clusters of soft skills have been detected
- Overlap of bubbles for three professional figures
- Airport Maintenance Technician is isolated
- Particular situation about initiative and quality orientation

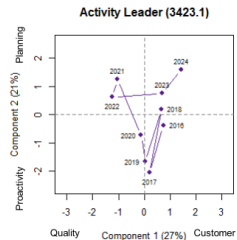
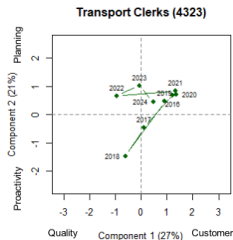
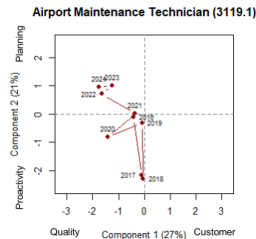
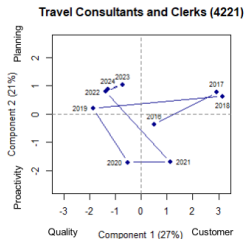


The dynamic aspect is better represented by the trajectory analysis!

Time trajectories for professional figures

Trajectory analysis

- Travel Consultants and Clerks reveal three distinct time clusters: 2016–2018, 2019–2021, 2022–2024
- Bottom-up shift for Airport Maintenance Technicians from low levels of initiative in 2018–2019 to a growing emphasis on autonomous action in 2022–2024
- Transport Clerks remains highly concentrated toward the center, indicating little change in soft skill demands over the years
- Activity Leaders show a similar bottom-rightward movement



The contribution of the gender as supplementary variable

The introduction of the gender variable in the analysis highlights a point of contact between the problem solving analytical and the female gender, and a lighter association between initiative and the male gender.



Gender as stratification variable

To detect other potential gender effects, the same approach has been applied using gender as a stratification variable. The original dataset has been split into two datasets, one with job offers hired by males and the other one by females.

The idea is to compare the time trajectories looking for differences.

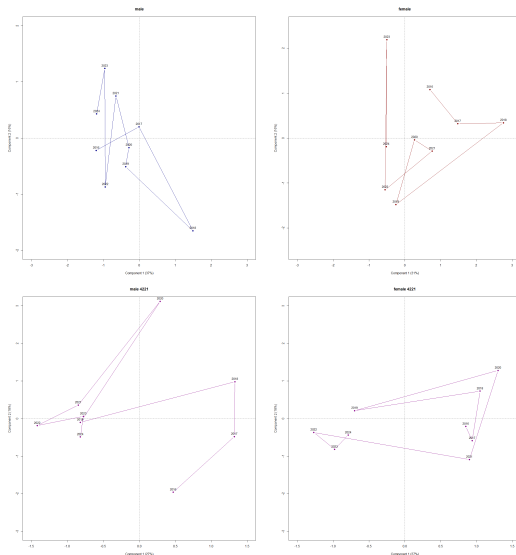
The analysis has been repeated for the entire tourism sector and for Travel consultants and clerks position. It was not possible to reply the stratified study the other job figures because of the lacking number of the offers.

These stratified analysis are generated only by considering job contracts with at least 14 days.

Stratified for gender time trajectories

Trajectory analysis

- Gender trajectories are different but with similar patterns
- All the sub-analysis explains a similar percentage of variance with the first 2 components (around the 50%)
- For the entire sector, trajectories show 2023 as the peak period
- For the Travel consultants and clerks, 2020 shows anomalous values probably to Covid-19



Conclusions

- This study analyzed the dynamic relationship between professional figures and the required skills in the tourism sector in Italy from 2016 to 2024 with a particular focus on gender equality showing significant trends and dynamics in the recruitment process for four job profiles.
- This evolution in the soft skills also affects the gender of the employee used as supplementary variable underlining a clear association emerges between the female gender and skills such as problem-solving.
- When gender is used as stratification variable, time sub-trajectories are different with some common points confirming the hypothesis of potential inequalities in the request of soft skills.
- Future studies could regard the application of this approach also considering different economic sectors or implementing other socio-demographic features as supplementary variables.