

Searching for new trends and dynamics in Labour Market: a statistical approach for the recruiting process

Nuovi trend e dinamiche nel mercato del lavoro: un approccio statistico per il processo di reclutamento

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Abstract In this paper, the roles of the most requested skills for getting a job in Italian Labour market are investigated using a new data set created by combining information from business and external sources. From a methodological point of view, a Conjoint analysis is performed to estimate the partial utilities for the most requested skills and their importance in defining the best combinations of skills to match job requirements. In particular, the profiles of workers recruited by The Adecco Group in Italy in the period 2016-2021 have been analysed detecting dynamics and movements during last years.

Abstract *Il contributo analizza il ruolo delle skills richieste nel mercato del lavoro italiano usando un nuovo dataset creato combinando dati provenienti da fonti aziendali ed esterne. Da un punto di vista metodologico, una Conjoint analysis è stata implementata ai dati per stimare le utilità parziali legate alle competenze più richieste definendone la migliore combinazione desiderata in un'ottica di reclutamento. In particolare, i profili dei lavoratori reclutati da The Adecco Group in Italia nel periodo 2016-2021 sono stati analizzati alla ricerca di trend e dinamiche negli ultimi anni.*

Key words: Italian labour market, Job matching, Skills analysis

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1 Introduction

In social and economic systems, the role of labour is fundamental, both for the aspects strictly related to labour as a production factor and for the perspectives regarding workers. The access to the labour market represents a key point for the supply and demand side. About the supply, the role of knowledge, abilities and attitudes leads to the consideration of models and formative offers for their creation and implementation. On the other hand, about the demand, the economic context and the effect of technical progress activate examples of improvement in roles and difficulties in the definition of short-term scenarios.

According to the World Economic Forum, more than half of all employees will request a re-qualification before 2022. Among these employees, one third will need further education for six more months, and one fifth will need further education for a longer period [6]. According to the International Labour Organization (ILO), enterprises and employers will need to make new investments to expand their involvement in the education, training and re-skilling of workers to support economic growth. Additionally, workers will need to pro-actively upgrade their skills or acquire new ones through training, education and learning to remain employable [2].

Competencies could assume a central role in the competitiveness of firms and workers; for this reason they could represent a keystone of the retribution. Competencies may become a candidate in the integration or substitution the remunerative parameters, thus serving as a new tool in the relationship between jobs and wages.

The analysis was based on research proposed by The Adecco Group in Italy on new hires starting from 2016 to 2021. Information regarding goodwill, albeit with a managerial and administrative slant, provides a source of knowledge structured on the basis of the criteria that companies adopt in their choices of workers who apply for job positions in their companies. The aim of this work is to understand whether it is possible to define a time trajectory for some professional roles detecting trends and dynamics useful in the recruiting process.

The paper is structured as follows: after the introduction, a second section is dedicated to the methodologies used to answer the research objectives. A third section will show the description of the dataset and some preliminary results.

2 Conjoint analysis and choice models

In this paper, a conjoint analysis has been applied for the study of the choice models [3, 5] of the companies, starting from the preference expressed by the companies with respect to different possible configurations of requirements related to the professional profiles. The value of the level of satisfaction obtained by a company with respect to the obtained requirements is designated as Utility.

The Utility function assigns a level of satisfaction to each requirement considered, in particular, in the form:

$$U = f(X) \tag{1}$$

where U is the utility level and X are the characteristics of the requirements.

The profile is determined by the assignment of a level to each requirement under examination; the number of the profiles depends on the number of the attributes and their categories. For the conjoint analysis, the preference and utility are in a bi-univocal correspondence: the more a candidate meets the requirements of a company, the more his/her use will lead to usefulness. The preference can be interpreted as the function of the levels of the characteristics of a candidate. Subsequently, based on the preferred choice of the company, partial utilities are calculated. They represent the importance associated with each level of the attributes and are called part-worth. Finally, the total utility is analysed as the sum or the product of partial utilities. From an analytical point of view, this modelling is expressed as follows:

$$U_j = \sum_{l=1}^L \sum_{k=1}^K u_{jkl} * x_{jkl} + e_j \quad (2)$$

where U_j the utility of the j -th profile, u_{jkl} the partial utility referred to the l -th level of the k -th attribute, x_{jkl} a dummy variable that assumes a value of 0 or 1 if the level l of the attribute k is absent or present in profile j and e_j is the random error [4]. For this case the choice of model [1] requires the construction of all candidate profiles a priori as a combination of all attributes and levels. Among these the only one that represented the choice of the company is the one related to the profile of the candidate launched.

3 Application

In this paper, the dataset is obtained as a merge of business sources in combination with external sources. Internal sources are represented by the Adecco Group database on job offers and necessary requirements for the hires. External sources are the ESCO (European Skills, Competences, Qualifications and Occupations) classification for abilities and skills for professional figures and the Italian National Collective Labour Agreement contracts.

Regarding the internal sources, two macro-categories of data were detected: Candidate and job offer. About candidate, data are present for registry information and previous work experience. On the other hand, about the job offer, the set of requested recruitments are represented for each position in terms of work experience, linguistic knowledge, etc. About the external sources, the database has integrated the following information through the ESCO database and Italian National Collective Labour Agreement contracts. The ESCO (European Skills, Competences, Qualifications and Occupations) Taxonomy is used as a dictionary, to describe, identify and classify professional figures, abilities and qualifications relevant to the European labour market. The second external source is about retributive tables provided for the national level of different contracts.

Since data are available for a period of six years, from 2016 to 2021 (provisional data until September 2021), the analysis could be repeated for each year in order to find differences in the selected period. Beyond the differences, it is possible to sketch a defined path over the entire period. This path could be represented from a graphical point of view through the use of a time trajectory. The statistical unit is represented by a person receiving a job, and there were more than 1.000.000 job positions divided into the following 9 industries: Production and Logistic, Food services, Commercial and Marketing, Human Resources, Legal and Finance, Medical and Pharmaceuticals, Engineering, Tourism and Fashion, IT and Digital. In table 1, the distribution of the job positions over the entire period and the industries is displayed.

Table 1 Distribution of the job positions over the period and the industries, Italy, 2016-2021

Industry	2016	2017	2018	2019	2020	2021
Production and Logistic	127.012	159.449	136.831	103.973	99.879	92.141
Food services	24.041	29.648	27.337	23.096	12.085	12.843
Commercial and Marketing	14.595	18.099	12.708	10.117	7.971	7.889
Human Resources	5.925	7.044	7.792	6.336	4.153	3.610
Legal and Finance	3.520	3.667	4.016	4.183	3.240	2.734
Medical and Pharmaceuticals	2.508	2.369	2.275	1.958	2.074	1.310
Engineering	1.856	1.838	1.734	1.481	1.034	905
Tourism and Fashion	5.847	6.843	6.309	3.807	1.801	589
IT and Digital	727	705	751	685	497	458
Total	186.031	229.662	199.753	155.636	132.734	122.479

Source: elaboration on The AdeccoGroup data

As it is possible to note from the Table 1, some preliminary differences at industry level are present. If the sector with more job offers is Production and Logistic for the entire period, Tourism and Fashion had a clear decrease in last years passing from 3% in 2016 to 0.5% in 2021. Starting from these differences, it will be possible to detect changes also in terms of skill required for the recruitment.

References

1. Dagsvik, J.K. Random utility models for discrete choice behavior. An Introduction. Statistics Norway Research Department, Norway (1998)
2. International Labour Organization, Skills, knowledge and employability (2018)
3. Krantz, D.H. Conjoint measurement: The Luce-Tukey axiomatization and some extensions. *J Math Psychol.* 2, pp 248-277 (1964)
4. Luce R D, Krantz D H, Conditional Expected Utility. *Econometrica*, 2, pp 253-271 (1971)
5. Street D J, Burgess L, The Construction of Optimal Stated Choice Experiments: Theory and Methods. Wiley, New York (2007)
6. World Economic Forum. The future of jobs report 2018. World Economic Forum, Geneva, Switzerland, (2018)