

COMPANY REQUIREMENTS AND MONETARY EVALUATION IN THE ITALIAN HEALTHCARE INDUSTRY

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Abstract. *During last years, many studies have been based on the possibility to give a monetary value for knowledge, skills and attitudes of a candidate during the recruitment process. This work carries out the evaluations of these requirements for individuals that through HR company have placed themselves in the phase of match with the different professional figures. This work will focus the attention on healthcare industry. Starting from data about job vacancies for this sector in Italy in 2017, the aim of the work is to carry out a monetary evaluation of the most important requirements. The analysed requirements have been chosen among a set of soft skills and join with the experience and two knowledge indicators. The methodology used for this work is the choice based conjoint analysis. Using this model, it is possible to identify the features of a candidate that mainly influence the entrepreneurs' choice and the weight of these requirements in the wages. The use of a choice based conjoint model allows to obtain partial utilities that representing the starting point to build a monetary re-valuation index. This index can determine the monetary variation associated with any change in the combination of the attributes of a job with respect to the actual revenue generated by that job.*

Keywords: *Conjoint analysis, Labour market, Requirements, Healthcare industry*

1. INTRODUCTION

In 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. In particular, the access to the labour market represents a crucial point for the supply and demand side. About the supply side, 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, the economic context and the effect of technical progress activate examples of improvement in roles and difficulties in the definition of short-term scenarios.

The mismatch between demand and supply of competencies in the labour market, namely a situation in which the skills requested by employers differ from

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those possessed by job seekers, can assume several forms. If this situation becomes stable, it could produce economic and social drops in the short and long term. Some studies of the European Commission observed that the offer of competencies shows a clear delay with respect to changes in labour demand, clearly oriented towards more qualified manpower (EuropeanCommission, 2017).

Beyond the persistence of the economic crisis, a lot of companies try to invest in innovation. This approach represents one of the levers that support growth. In Italy, one third of private companies express development requirements in terms of updating skills to guarantee better work performance. Most occupational dynamics are not focused on the decrease in job positions but rather are focused on the transformation of tasks and required skills. Many competencies are not considered crucial at the present time, but they will become critical in the future, especially social and cognitive tasks. The jobs of the future will encompass a larger integration of the functional and cultural dimensions that connect work and learning (De Biase, 2018).

According to the World Economic Forum, more than half of all employees will request a re-qualification before 2022 (WEF, 2018). Following the International Labour Organization (ILO), enterprises and employers will need to make new investments to expand their involvement in the education, training and reskilling of workers to support economic growth (ILO, 2018). In 2017, the OECD stated that sectors and nations may take advantage of better management of skills (Grundke et al., 2017).

The technological evolution transformed all sectors in Italian economic starting from media and entertainment until to the healthcare sector. Beyond a set of structural and normative factors regulating the adoption of innovations in this sector, digitalisation is allowing enhancements in different steps of the value chain. Specifically, it has become a strategic factor to enlarge the productivity through an enlargement of the products and an improvement of the customer experience Farindustria (2019).

The pharmaceutical industry underlines a set of characteristic elements of the healthcare sector limiting the implementation of these innovations: a focused regulation more on the safety of the patients instead on favouring changes at industrial level; a very long innovation process regulated under the control of authorized institutions; a separation between final users (patients) and payers (i.e. Italian Health System and insurances).

At global level, a lot of examples of digital innovation are present in the healthcare system with maturity levels on the base of region, application and specific companies. Significant investments in the digital healthcare, often substained by venture capital and private equity, quadrupled the allocated resources during last

5 years. Moreover, big technological players as Google, Samsung, Apple and IBM Watson, searching for new growth opportunities in the healthcare sector, are creating new market spaces.

Digital innovation implies a strong discontinuity in terms of competencies and organizational model. In this sense, other sectors different from the healthcare sector offer some interesting hints also useful for the challenges actually faced by the pharmaceutical industry. For example, some new professional figures have been created to guide the digital innovation: the Chief Digital Officer, the Advanced Analytics, the Cyber security expert and the Digital Marketing expert.

About the development of specific competencies, the Italian healthcare industry is perceived on a good level, in particular in the R&D processes. A greater endowment of skills tailored to the needs of companies represents a necessary condition to access the job market limiting the missing link between specialized competencies and those possessed by workers.

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 current remunerative parameters, thus serving as a new tool in the relationship between jobs and wages.

The proposed approach is to manage data about job offers in the healthcare sector searching for an evaluation of the competencies. The motivation of the research is to examine which skills are most important for getting a job in the healthcare sector. Analysis is focused on the Italian labour market. This potential relation is measured by combining job offer variables and candidates' features with utilities derived from a flexible segmentation approach. Even if the number of requirements is already used as a proxy of the complexity of the job offer, the idea is that each requirement could not be considered at the same level for a new hiring. Here requirements are classified to measure a possible variation in monetary terms (Mariani et al., 2019).

After choosing healthcare sector, an analysis of the different professional roles within the sector is proposed. Moreover, a comparison between different Italian regions is introduced to detect potential differences. The rest of the paper is organized as follows. In section 2, the conjoint model used for the analysis is described. Results are shown and discussed in section 3. Section 4 concludes.

2. THE USE OF A CONJOINT ANALYSIS MODEL IN LABOUR MARKET

In this paper we use the conjoint analysis (Krantz, 1964) which is applied in this case in the study of the models of choice (Street and Burgess, 2007) 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:

$$U = f(X) \quad (1)$$

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

It is necessary to introduce some terminologies related to this methodology:

- Factors or attributes: the requirements under examination, i.e., the variables that the researcher controls in a conjoint experiment to measure the effect on the consumer's usefulness;
- Levels: these indicate the different ways in which the attributes are manifested (the categories of the attributes);
- Profile or stimulus concerns a specific combination of the attribute levels.

The profile is determined by the assignment of a level to each attribute; the number of the profiles depends on the number of levels and attributes. In this analysis, the attributes are represented by the requirements requested by the companies. 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 (Luce and Tukey, 1964), (Luce and Krantz, 1971):

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

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 1 if the level l of the attribute k is present in profile j , and assumes a value of 0 otherwise;
- e_j is the random error.

For this case the choice of model (Dagsvik, 1998) 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. The method used to estimate partial utilities in this context is logistic regression (McFadden, 1973), as a model with qualitative predictors (Louviere et al., 2010).

In particular, the probability that the i -th company chooses the j -th profile is given by the following:

$$P_{ij} = \frac{\exp(u_{jkl} * x_{jkl})}{\sum_{l=1}^L \sum_{k=1}^K \exp(u_{jkl} * x_{jkl})} \quad (3)$$

It is possible to obtain the overall utility in the correspondence of all the profiles, simply by applying the linear combination of utilities. In the context of the conjoint analysis, it is also possible to evaluate the relative importance of the attribute, to make partial utilities comparable and to reach the importance values of the factors between 0 and 1, or in the form of a percentage, through the following formula:

$$I_k = \frac{\max(u_k) - \min(u_k)}{\sum_{j=1}^J [\max(u_k) - \min(u_k)]} \quad (4)$$

where $u_k = [u_{k1}, \dots, u_{kL}]$ is the vector containing the partial utilities of the k -th attribute. The percentage of importance for the k -th attribute is obtained by comparing the difference between the maximum value and the minimum value of utility relative to the attribute itself, to the sum for all the attributes of that difference. The more the change in the levels of an attribute affects utility, the greater the importance of that factor. The relative importances of each attribute can be used to obtain an assessment of the change in the remuneration of a new hire, associated with the modification of the simultaneous combination of several attributes describing the skills and characteristics of the professional profile examined.

This methodology has been applied in a context of labour market, in particular this data structure has been exploited at the inner of the recruitment process. This process could be represented by the following steps: firstly, companies highlight the role covered by a new resource; secondly they recruit a shortlist of candidates using job advertisements or other channels, above aforementioned; after the examination of the CVs, there is the evaluation of competencies, attributes and attitudes of the candidates. Usually this part could be realized using some psychological tests or job interviews, here the proposed approach looks to a statistical method to assess these skills giving a monetary evaluation to each competence. The requested requirements by companies during the recruitment process could be divided into 3 categories: knowledges as set of structured principles and theories useful for the correct

implementation of the profession; abilities as procedures and processes defining the capabilities to accomplish the professional tasks; attitudes as cognitive features affecting the professional development and the execution of job activities. The aim of this work is to measure the monetary evaluation of the skills useful to get the job offer using an a-posteriori analysis on the hired candidates.

Part-worth utilities of levels obtained from choice based conjoint analysis represents the starting point to re-evaluate the proposed Gross Annual Salary of the job vacancies. Secondly, economic re-evaluation will be carried out through relative importance of attributes in non-standard CA using Mariani-Mussini coefficient of economic valuation Mariani et al. (2019). The general formulation of the coefficient is:

$$MI_{ij} = \frac{U_i - U_b}{U_b} * I_j \quad (5)$$

where U_i is the sum of part-worth utility scores associated with the profile i , U_b the sum of utility scores associated with a baseline profile and I_j is the relative importance for the attribute j .

The coefficient MI_{ij} could be also used for estimating the variation in terms of the salary associated to profile i compared to the baseline one. Given the salary associated with the baseline profile π , the coefficient of economic re-evaluation can be expressed as:

$$V_{ij} = MI_{ij} * \pi \quad (6)$$

Variations V_{ij} change in proportion of the I_j , when an attribute has a very high value of importance, V_{ij} assumes higher variations. Secondly, V_{ij} concern attribute variations one at a time, that is to say profile comparisons are possible only varying an attribute, holding fixed all others.

3. AN APPLICATION ON ITALIAN HEALTHCARE SECTOR

In this study information are represented by data on the job offers and the requirements needed for the hiring. Data included in the database involved features of candidates and job offers, and those job vacancies were transformed into new hirings. Personal record includes variables about candidates, such as gender, nationality, birth date and educational level. In the same table, some variables are present about the job offer: start and end date of the contract, economics sector, sub-sector, dimension of the company and professional role. Finally, last part of data collect information about soft skills owned by candidates. The economics sector are divided into 9 categories: information technology and digital, engineering, healthcare, finance, tourism, human resource, commercial, food services and production. The

number of professional sub-sectors is 146 and the number of professional figures is 574. 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. For this application only job offers related to the healthcare sector have been included in the analysis. The total of job offers present in the database is equal to 121.171. As it is shown in table 1, job offers for healthcare sector are 2.340. Moreover, only 48,0% of the total have been analysed, a not-random selection of the job offers has been carried out to build a national reference. This selection has been realized in order to balance the representation of all the industries. For example all records with duration until 28 days have been deleted from the analysis.

Tab. 1: Job offers distribution for Industry - Italy, 2017

Industry	Job offers	Analysed job offers
IT & Digital	696	85,3 %
Engineering	1.779	79,3 %
Healthcare	2.340	48,0 %
Legal and Finance	3.581	48,7 %
Tourism	6.778	22,5 %
Human Resource	6.886	33,6 %
Commercial and Marketing	17.840	13,2 %
Food services and hospitality	29.408	7,1 %
Production and Logistic	51.863	24,9 %
<i>Total</i>	121.171	21,5 %

Source: elaboration on healthcare labour market data

The analysed requirements have been chosen among 26 skills included in the AdeccoGroup competence dictionary and join with the experience and two knowledge indicators. Specifically the 7 with the highest frequency have been inserted in the model.

The frequency distribution of the selected requirements is displayed in table 2, the previous experience is the more requested with 56,6% followed by the knowledge indicators, the English knowledge and the education level. Among the soft skills, the more demanded is the quality orientation with 41,0%, the lowest percentage is 15,2% represented by customer orientation. This frequency distribution is referred not to the healthcare sector but to the entire dataset.

The 9 industries presented different compositional aspects compared to the total of job offers and candidates. A ΔGAS has been introduced as the difference

between the average GAS (Gross Annual Salary) and the minimum salary provided by CCNL. Specifically, healthcare industry stands for 1.9% of the total of the job advertisements. The ΔGAS for the healthcare sector is equal to e 17.000,00 (see Table 3). It is important to note that percentages of job offers and candidates differ each other because of repeated job offers for the same candidate.

Tab. 2: Frequency Distribution of requirements - Italy, %, 2017

Requirements	Frequency
Previous experience	56,6%
English Knowledge	43,2%
Education level	41,7%
Quality orientation	41,0%
Team working	36,0%
Participation and responsibility	33,8%
Problem Solving and analysis	32,1%
Communication	21,3%
Self-control	18,9%
Customer orientation	15,2%

Source: elaboration on labour market data

The proposed approach is applied on 2.340 job offers of the Italian healthcare sector. These offers correspond to 1.264 different individuals, these means that for the remaining part they refer to repeated contracts. The average Gross Annual Salary is equal to € 43.000,00, while the minimum GAS provided by CCNL is € 26.000,00 generating a theoretical ΔGAS of € 17.000,00. In the bottom part of table 4, there is the ranking of the requirements from the one with the highest monetary valuation to the lowest.

The self-control is the most evaluated competence with an estimated ΔGAS equal to € 4.357,11. High values of monetary revaluation are present also for customer orientation, participation and responsibility and quality orientation. Other skills reach residual values with the education level that is worth only € 18,96. Another important index present in table 4 is total amount of estimated ΔGAS . If this value is close to the real ΔGAS , then the approach gives satisfactory results. For this sector, the difference is more than € 3.000,00.

Two main focuses have been provided to examine in depth the obtained results. From one hand, since information on the location of the job offers is available, a regional focus has been conducted for 6 Italian regions. On the other hand, the entire healthcare sector is made by different job figures, so it is possible to compare these results with those relative to a specific professional figure.

Tab. 3: Job offers and candidates for sector and differentiation in salary - %, €

Industry	Job offers (%)	Candidates (%)	ΔGAS
IT & Digital	0,6	1,0	€ 10.000,00
Engineering	1,5	2,3	€ 9.000,00
Healthcare	1,9	1,9	€ 17.000,00
Legal and Finance	3,0	4,4	€ 11.000,00
Tourism	5,6	3,6	€ 10.000,00
Human Resource	5,7	0,7	€ 11.000,00
Commercial and Marketing	14,7	12,0	€ 11.000,00
Food service and Hospitality	24,3	10,7	€ 6.000,00
Production and Logistic	42,8	63,4	€ 13.000,00
Total	100,0	100,0	€ 10.000,00

Source: elaboration on healthcare labour market data

3.1 A FOCUS ON SOME ITALIAN REGIONS

The regional focus has been realized on 6 out of 20 Italian regions: Piedmont, Lombardy, Tuscany, Veneto, Emilia-Romagna, Lazio. Results about remaining regions have not been commented because of the low number of new hired in 2017 in healthcare sector.

In Piedmont for the healthcare industry the number of offers is equal to 238. For this region the customer orientation has an importance index equal to 28,4% and a monetary valuation of € 5.811,73. Selfcontrol, quality orientation and participation and responsibility show importance indexes between 18,1% and 20,5% and monetary contributions between € 2.353,47 and € 3.027,28. Total Estimated ΔGAS is 14.056,36 far from the real ΔGAS of € 17.000.

In Lombardy, there is a confirm of customer orientation as the most valued skill with an importance index higher than 20% (monetary valuation € 3.601,14). Self-control and problem solving presents high values while the value of all other competencies is under to € 1.000. Total Estimated ΔGAS is € 12.520,72 very far from the real ΔGAS of 17.000.

In Veneto, the total number of observation is 97. Self-control, customer orientation and quality orientation show importance index equal to 23,7%, 15,1% e 11,3% with a monetary revaluation of € 4.840,27, e 1.968,50 and € 1.090,56. Total Estimated ΔGAS is 11.498,52 very far from the real ΔGAS of € 17.000.

In Emilia-Romagna, the sum of first three requirements more requested, that is to say quality orientation, self-control and customer orientation, reaches an importance index of 55,5% associated to differential values equal respectively to € 3.599,10, € 3.016,71 and € 2.295,97. At fourth place, there is participation and responsibility (13,8% and € 1.624,83). The contributions of other 6 requirements

Tab. 4: Monetary re-valuation for healthcare sector - Italy, € , 2017

Job Offers	2.340
Individuals	1.264
Average GAS	€ 43.000,00
Minimum GAS (CCNL)	€ 26.000,00
ΔGAS	€ 17.000,00
Requirements	Estimated ΔGAS
Self-control	€ 4.357,11
Customer orientation	€ 3.791,09
Participation and responsibility	€ 2.265,41
Quality orientation	€ 2.187,68
Team working	€ 325,20
Problem Solving and analysis	€ 305,30
Communication	€ 196,97
English Knowledge	€ 143,94
Previous experience	€ 29,33
Education level	€ 18,96
Total	€ 13.620,99

Source: elaboration on healthcare labour market data

are more residuals (percentage values between 7,3% and 2,5%). Total Estimated ΔGAS is € 12.094,69 very far from the real ΔGAS of € 17.000.

In Tuscany, the first three requirements more valued in healthcare sector are customer orientation (26,2%), participation and responsibility (23,6%) and selfcontrol (17,8%). Respectively, values of estimated ΔGAS are € 5.895,41, € 4.795,62 and € 2.720,24. Total Estimated ΔGAS is € 15.290,07 very close to the real ΔGAS of € 17.000.

In Lazio, the healthcare sector contains 128 job offers. The peculiarity of this sector is that ΔGAS involves only 6 of 10 competences, excluding 4 requirements: quality orientation, team working, problem solving and English knowledge. This entails high values for the remaining ones. The most evaluated is customer orientation with 25,5% and € 5.571,38. Total Estimated ΔGAS is € 15.970,20 very close to the real ΔGAS of € 17.000.

Results are summarized in table 5 and confirmed the evidences at national level, with a rising interest for customer orientation. This skill is the most valued in 4 regions over 6 reaching the maximum value in Tuscany. Self-control remains the best skill in Veneto and Emilia-Romagna. About the total estimated ΔGAS , only in Tuscany and Lazio this value is very close the reference one of € 17.000,00.

Tab. 5: Total Δ GAS and best requirements for 6 Italian regions, €, 2017

Region	Total Δ GAS	Best Requirement	Requirement Δ GAS
Lombardy	€ 12.520,72	Customer orientation	€ 3.601,14
Piedmont	€ 14.056,36	Customer orientation	€ 5.811,73
Tuscany	€ 15.290,07	Customer orientation	€ 5.895,41
Veneto	€ 11.498,52	Self-control	€ 4.840,27
Emilia-Romagna	€ 8.567,62	Self-control	€ 2.848,87
Lazio	€ 15.970,20	Customer orientation	€ 5.571,38

Source: elaboration on healthcare labour market data

3.2 A DETAILED STUDY ON PHARMACISTS

Job profiles considered for the Medical and Pharmaceutic sector are: hospital porters, nursing associate professionals, medical and pathology laboratory technicians and pharmacists. Only results about pharmacists are presented for this study and compared to the total sector. This figure has been chosen as a reference figure for the healthcare sector.

Pharmacists store, preserve, compound and dispense medicinal products and counsel on the proper use and adverse effects of drugs and medicines following prescriptions issued by medical doctors and other health professionals (ESCO, 2018).

Tasks of the pharmacists include: receiving prescriptions for medicinal products from medical doctors and other health professionals, checking patients medicine histories, and ensuring proper dosage and methods of administration and drug compatibility before dispensing; preparing or supervising the preparation and labelling of liquid medicines, ointments, powders, tablets and other medications to fill prescriptions; providing information and advice to prescribers and clients regarding drug interactions, incompatibility and contraindications, side effects, dosage and proper medication storage. (Isfol, 2018)

In table 6, the ranking of partial utility achieved from Conjoint Analysis is displayed for the entire sector and for the pharmacist professional figure. As it is possible to note, two rankings are quite different. On one hand, the first position that is equal in both rankings and it is self-control. Alternatively, there are customer orientation and previous experience that are not significant differently from 0 for pharmacists. However, if considered only the 8 requirements in both rankings, the correlation coefficient is 0.857.

As realized for the entire sector, a similar analysis (Table 7) is reported for pharmacists about the monetary re-valuation. The number of job offers for pharmacists is 202 corresponding to 139 different individuals. The average Gross

Tab. 6: Skills ranking for healthcare sector and pharmacists - Italy, 2017

Requirements	Med. and Ph. Sector	Pharmacists
English Knowledge	8	5
Education level	10	8
Quality orientation	4	2
Team working	5	3
Participation and responsibility	3	4
Problem Solving and analysis	6	6
Communication	7	7
Self-control	1	1
Previous experience	9	-
Customer orientation	2	-

Source: elaboration on healthcare labour market data

Annual Salary is equal to € 37.000,00, while the minimum GAS provided by CCNL is € 26.000,00 generating a theoretical ΔGAS of € 11.000,00. The average Gross Annual Salary is definitely inferior to the corresponding of the entire sector.

The self-control is still the most evaluated competence with an estimated ΔGAS equal to € 7.124,55. High values of monetary revaluation are present also for quality orientation, team working and participation and responsibility. Other skills reach residual values with the education level that is worth only € 180,75. Total Estimated ΔGAS is € 13.333,40 close to the real ΔGAS of € 11.000. Respect to the entire sector, this time the estimated ΔGAS over estimate the expected one.

Tab. 7: Monetary re-valuation for pharmacists - Italy, € , 2017

Job Offers	202
Individuals	139
Average GAS	€ 37.000,00
Minimum GAS (CCNL)	€ 26.000,00
ΔGAS	€ 11.000,00
Requirements	Estimated ΔGAS
Self-control	€ 7.124,55
Quality orientation	€ 1.878,93
Team working	€ 1.812,60
Participation and responsibility	€ 1.515,69
English Knowledge	€ 322,22
Problem Solving and analysis	€ 305,86
Communication	€ 192,80
Education level	€ 180,75
Total	€ 13.333,40

Source: elaboration on healthcare labour market data

4. SUMMARY AND CONCLUSIONS

The aim of this paper is to give a monetary evaluation to the requested competences during the recruitment process. Specifically, to do this purpose, an a-posteriori analysis has been carried out on a database considering job offers in Italy in 2017. This analysis is specified as a-posteriori because only data about hired candidates are available. From a methodological point of view, the proposed approach provides the use of a Choice Based Conjoint Analysis has been used in combination with an economic index of re-valuation applied on Gross Annual Salary (GAS). The total dataset contains more than 120.000 job offers, for this study only advertisements about healthcare industry have been taken into account. For this sector the number of observations is equal to 2.340. Self-control appears as the competence with the highest monetary valuation of € 4.357,11. Relevant values are also present for customer orientation, participation and responsibility and quality orientation.

Two main focuses have been provided to examine in depth the obtained results. A regional focus conducted for 6 Italian regions shows a growing interest for customer orientation that is the most important skill for 4 regions over 6. Tuscany and Lazio are regions in which the total estimated ΔGAS is very close the real one. On the other hand, the analysis of a specific job figure, the pharmacist, confirms self-control as the requirement with the highest values of re-valuation. Good results has been obtained comparing the estimated ΔGAS with the difference between the average GAS and the minimum provided by CCNL.

Future works could regard the use of this approach for other economic sectors and professional figures. Furthermore, similar data about 2018 will be available for this study inciting the comparison with data here analyzed.

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REFERENCES

- Dagsvik, J. (1998). Random utility models for discrete choice behavior. an introduction. In *Statistics Norway Research Department, Norway*.
- De Biase, L. (2018). *Il lavoro del futuro*. Codice edizioni.
- EuropeanCommission (2017). *Scheda tematica per il semestre europeo - Competenze per il mercato del lavoro*.
- Farindustria (2019). *Definizione dei nuovi profili professionali necessari ed emergenti per la gestione della digitalizzazione dell'industria farmaceutica*.
- Grundke, R., Jamet, S., Kalamova, M., Keslair, F. and Squicciarini, M. (2017). *Skills and global value chains*. OECD, Paris.

- ILO (2018). *Skills, knowledge and employability*.
- Isfol (2018). *La domanda di professioni e di formazione delle imprese italiane nel 2018*.
- Krantz, D.H. (1964). Conjoint measurement: The luce-tukey axiomatization and some extensions. In *Journal of Mathematical Psychology*, 1 (2): 248–277.
- Louviere, J.J., Flynn, T.N. and Carson, R.T. (2010). Discrete choice experiments are not conjoint analysis. In *Journal of Choice Modelling*, 3 (3): 57–72.
- Luce, R.D. and Krantz, D.H. (1971). Conditional expected utility. In *Econometrica (pre-1986)*, 39 (2): 253.
- Luce, R.D. and Tukey, J.W. (1964). Simultaneous conjoint measurement: A new type of fundamental measurement. In *Journal of mathematical psychology*, 1 (1): 1–27.
- Mariani, P., Marletta, A. and Zenga, M. (2019). A new relative importance index of evaluation for conjoint analysis: Some findings for crm assistant. In *Social Indicators Research*, 146 (1-2): 135–148.
- McFadden, D. (1973). Conditional logit analysis of qualitative choice behavior. In *Institute of Urban and Regional Development, University of California*.
- Street, D.J. and Burgess, L. (2007). *The construction of optimal stated choice experiments: Theory and methods*, vol. 647. John Wiley & Sons, Hoboken.
- WEF (2018). *The future of jobs report 2018*. Geneva, Switzerland.