

**TECNIMETRO®**

**Skills 4.0  
for digital  
transformation**



**FGB**

Fondazione  
Giacomo Brodolini

## THE ENVIRONMENT IN WHICH WE MOVE

*Automation and interconnection of production change organizational and productive processes requiring new skills.*

The last challenge of the Italian manufacturing system, also called the Fourth Industrial Revolution, is also called "Industry 4.0" or the total automation and interconnection of production.

Based on this new course, which involves production processes, organisational as well as professional systems, the new "intelligent factory" will have to independently control and manage the production processes through the use of new digital and automated tools. The key technologies on which this technological revolution will be based involves fields such as cyber-security, big data, cloud computing, augmented reality, robotics, rapid prototyping, radio frequency identification and tracking, super connection of the systems and 3D printing.

Faced with this change, even the systems of skills of the professional figures, who work in the businesses in various capacities and in different production processes, require an adjustment, often even a substantial modification, in order to adapt to the new requests and requirements of the market. This adjustment anticipates a professional qualification and requalification which takes into account the new knowledge and methodologies that can be adopted in the new intelligent company.

The players involved in this process are, on the one hand, the employers, which must hire and use professionals and operators with adequate skills and on the other, the education (school, university) and professional training systems which must be able to renew the skills of the professional figures taking into account the new challenges proposed by Industry 4.0.

## THE CHALLENGES OF INDUSTRY 4.0 ON THE SKILLS AND PROFESSIONS SYSTEM

*The establishing of the digital culture and the Industry 4.0 systems creates, for the companies and institutions, specific challenges in terms of innovation and change.*



Be able to qualify young new graduates and/or requalify workers already employed or temporarily eliminated from the labour market because of the new skills and professionalism required by the current technological challenge.



Be able to select professional profiles suitable for the requests of the companies and the labour market, by identifying strong points and weakness, areas of flexibility and professional growth in order to be insert the right person in the right position.

## THE TECNIMETRO® FOR THE INDUSTRY 4.0 SKILLS

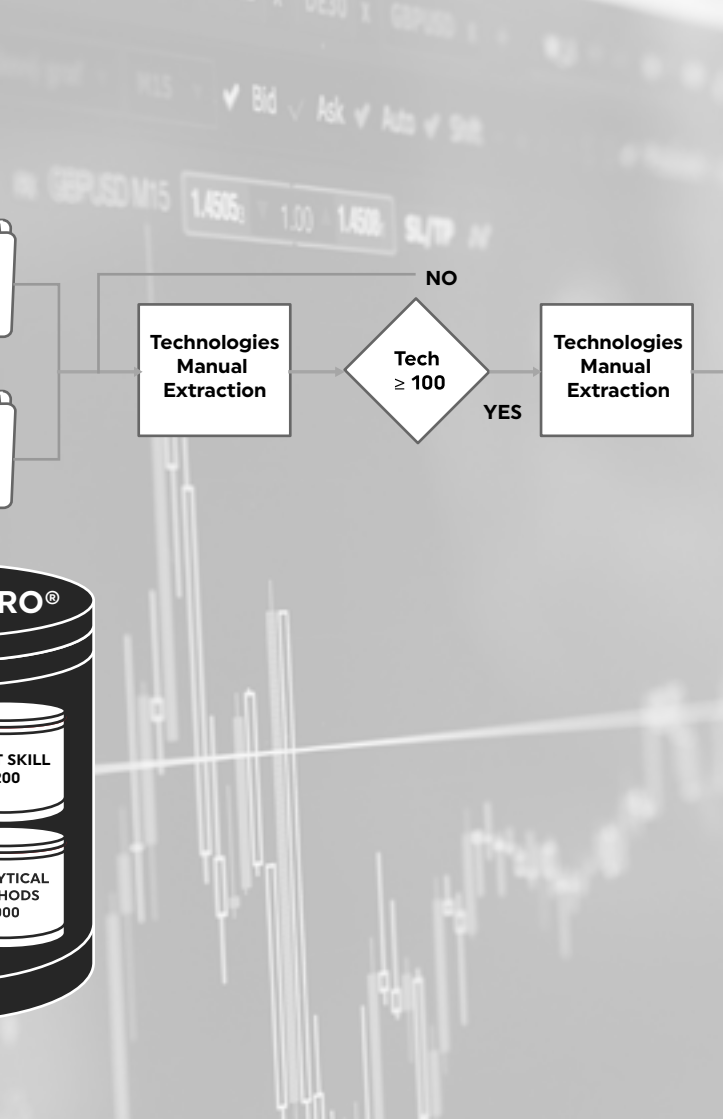
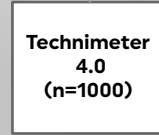
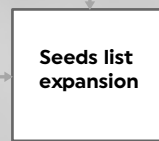
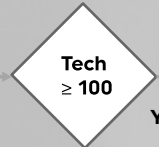
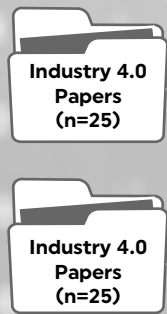
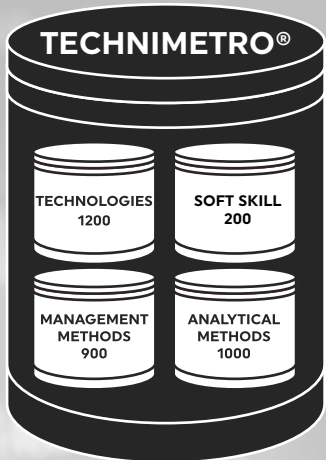
In order to identify the innovative skills necessary for the application and distribution of the technological and operational paradigms of Industry 4.0, the Giacomo Brodolini Foundation, in cooperation with the University of Pisa, has developed the Technimetro® of the Industry 4.0 skills, an adaptable and flexible instrument for identifying and mapping the new digital skills and making them usable to the system of the companies, the labour market and vocational training and education.

### WHAT IT IS

The Technimetro® is a database of terms and reports, in three languages (Italian, English and German), developed around the 4.0 paradigm. It is a totally **inter-linked** system, **expandable** to specific areas (e.g. Tourism, Agriculture, Food Production, etc.) and **applicable** to blocks (e.g. Logistics, Production, etc.).

The sources of the system are technical dictionaries, newspapers, scientific articles available from academic sources and open databases on the basic technologies most quoted in association with the keyword 4.0.





## HOW IT WORKS

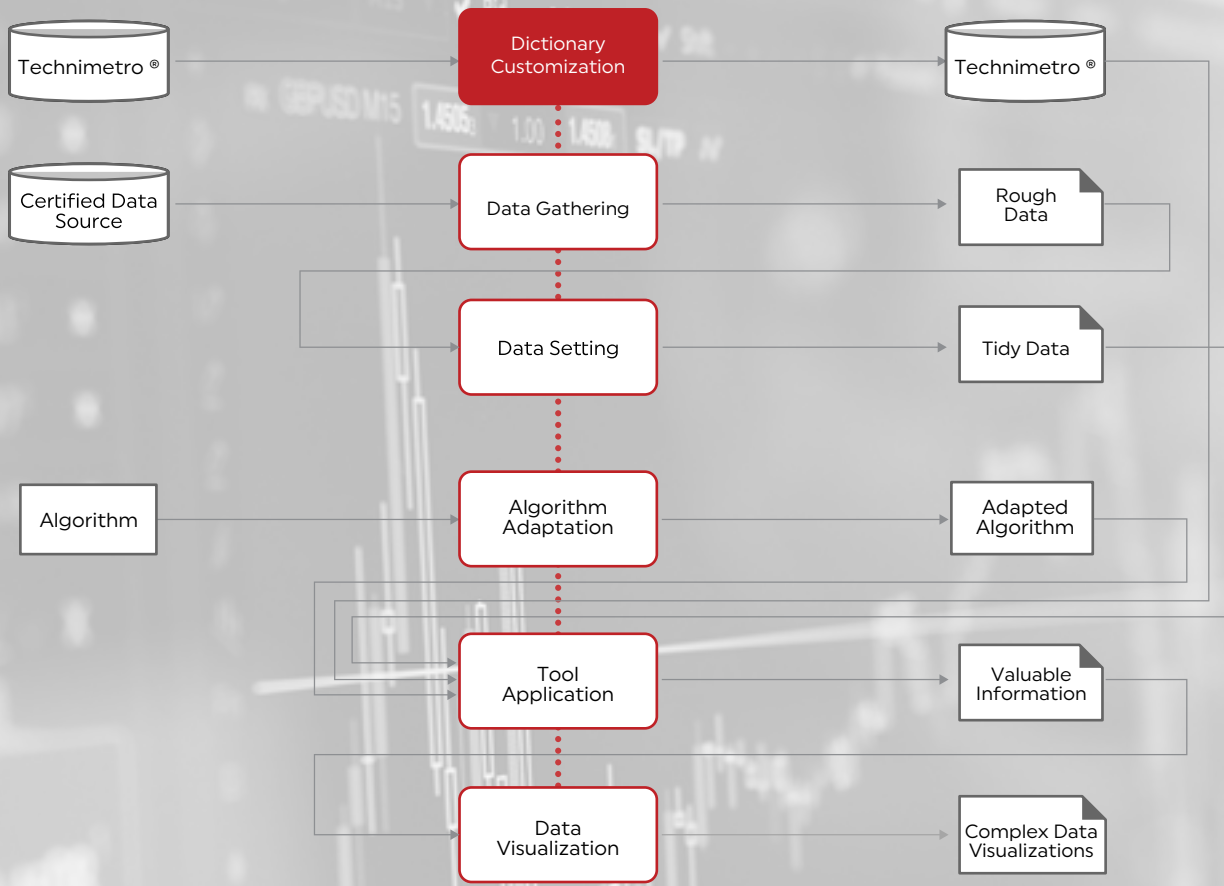
*The Technimetro® can be used for skills mapping, understanding of resilience/ obsolescence of professional profiles and description of new job profiles*

The instrument is set to map and list most of the skills referable to Industry 4.0 and pertaining to various processes (for example logistics, sales, production, etc.) in different production sectors (for example mechanics, tourism, agri-food, etc.). The results obtained will make it possible to identify and describe new job profiles, to update the already existing professional profiles and their related skills as well as to update and empower the professional education and training programmes and the training and professional standards useful for qualifying people.

The Technimetro® can also be customised, in particular if one is looking for technologies not strictly correlated to the 4.0 paradigm but in any case innovative of the medium and long term. In this case it is possible to expand the instrument and focus it on a new search.

The application workflow of the Technimetro for mapping innovative skills is structured in 4 specific phases.

- 1 Data Gathering:** the data entered into the analysis process must come from reliable, certified sources coherent with the subject of the analysis requested. The information collected will output, typically, "raw" data, in various formats (.pdf, .csv, .txt) and with various structures.
- 2 Data Setting:** the raw data is selected, cleaned and structured to be able to be efficiently processed during the subsequent phases.
- 3 Algorithm Adaptation:** the standard algorithm is adapted, with a few modifications, to the case in question.
- 4 Tool Application:** the Tool (composed of the algorithm adapted to the specific case and the Technimetro® possibly customised) is applied to the pre-processed database. In output, the significant information sought.
- 5 Data Visualization:** the information extracted following the application of the Tool is interpreted through the help of multiple, complex displays (e.g. Clustering, Trend, Ranking, etc.).

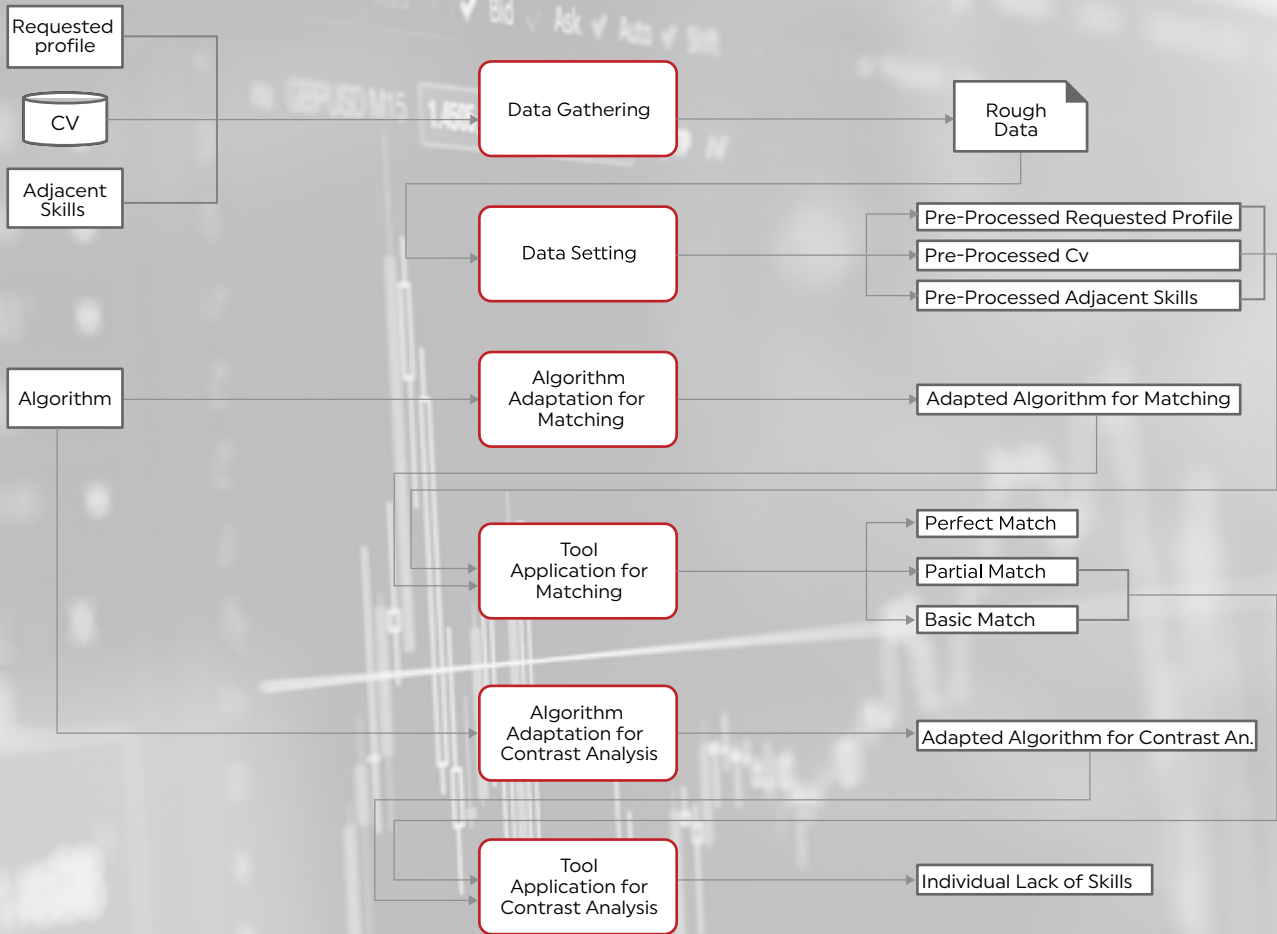




## *The Technimetro® for the preselection of CVs*

The tool is used to preselect the CVs for a specific work request or open position expressed by a company, an employment centre (public or private) or by other subjects and stakeholders of the labour market. Thanks to the Technimetro it will be possible to preselect CVs of individuals with the skills sought and, in addition, having skills that are congruous or also individuals who have only the skills sought but not the consonant ones and for whom it will be possible to define and ad hoc training/refresher plan. Also in this case it is possible to describe the application workflow of the Technimetro which is structured in 6 specific phases.

- 1 Data Gathering:** relative to CVs that the client must preselect, of a variable number and format, in order to optimise the performance of the analysis, it is preferable to have a CV in .csv format. At the same time, also the characteristics of the professional profile sought, in terms of soft/hard skills, age, languages, education, are also requested. Lastly, the client specifies what are the consonant skills of the profile, which constitute an added value.
- 2 Data Setting:** the raw data is selected, cleaned and structured to be able to be efficiently process during the subsequent phases.
- 3 Algorithm Adaptation for Matching:** the standard algorithm is adapted to permit the match between characteristics of the professional profile requested by the client and those of the numerous CVs.
- 4 Tool Application for Matching:** the Tool (composed of the algorithm adapted to the specific case and the specifications established by the client) is applied to the pre-processed database. Three classes of individuals in output:
  - Individuals with the skills requested (basic match);
  - Individuals with the skills requested and some of the congruous skills (partial match);
  - Individuals with the skills requested and all the congruous skills (perfect match).
- 5 Algorithm Adaptation for Contrast Analysis:** the standard algorithm is adapted to permit the analysis of the contrasts between the specifications of the client and the characteristics of the individuals belonging to Class 1 and 2.
- 6 Tool Application for Contrast Analysis:** the Tool (composed of the algorithm adapted to the specific case and the specifications established by the client) is applied to the individuals of Classes 1 and 2. At output the missing skills, for every single profile, to be integrated with ad hoc training.



## DELIVERABLES

The outputs obtained with the Technimetro, both during first use and during the second, are then processed and translated through a process of **structured and specific methodological computing**.

- In the case of mapping for identifying new job profiles, updating existing job profiles and education and vocational training qualification systems, the translation of the lists produced by the Technimetro is based on the description of the skills that can be decoded by several professional standards systems (e.g. ESCO system, EQF system etc.);
- In the case of selection of CVs, the processing and translation of the output of the Technimetro is based in the processing of the list of CVs selected and, for every CV a customized chart is processed in which strong points are identified and any consonant areas or those to be updated/trained.

At the end of this process, the client will have the following products:



**MAPPING PURPOSE:** Map of the skills to be updated or included in a new job profile, include training and/or professional standards and their possible inclusion in the directories and/or training plans.

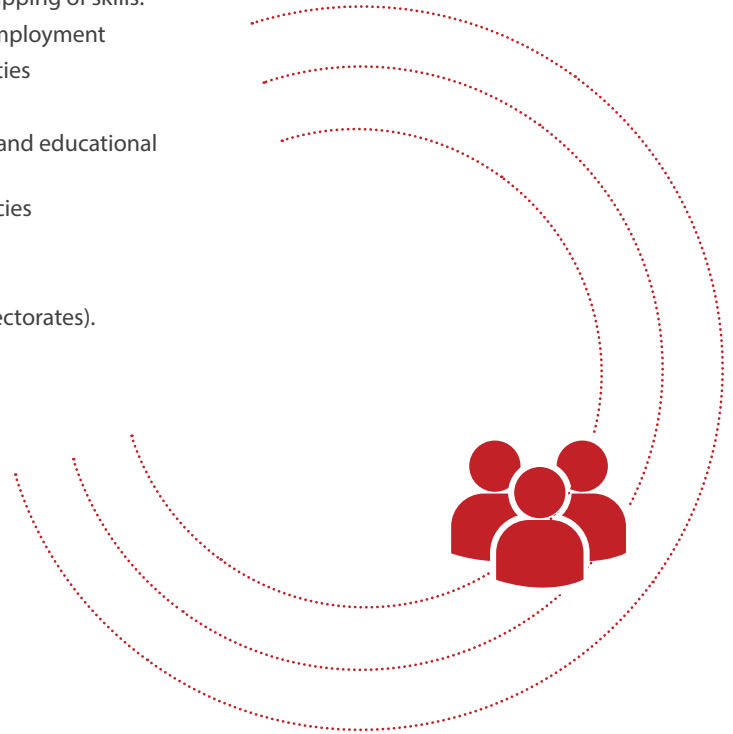


**PRE-SELECTION PURPOSE:** Pre-selection of the CVs (list of the CVs that best satisfy the work request) and preparation of specific technical charts, one for every candidate, indicating the strong points, the matches and correspondence with other innovative areas and possible skills to be trained/updated to improve the profile's potential.

## WHO COULD BE INTERESTED IN THE TECHNIMETRO

For the use of the technimetro in the mapping of skills:

- Regional administrations in charge of employment
- Education and vocational training activities
- Schools and universities
- Stakeholders involved in labour market and educational and vocational training systems
- Vocational training and education agencies
- Employment agencies
- Employers' associations
- Private companies (hr functions and directorates).



### CONTATTI

**Fondazione Giacomo Brodolini**

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## ABOUT

Fondazione Giacomo Brodolini - FGB - is a private, independent, not-for-profit foundation developing, implementing and disseminating evidence based policy at all governance levels. FGB promotes dialogue and a continuous knowledge exchange bridging the academic and policymaking communities, governments, civil society and the private sector.

FGB is an active player in providing technical support and services to foster economic development, social cohesion, employment and innovation through: research, evaluation, forecasting, communication, technical assistance and training.

FGB promotes and is engaged in local development at urban and rural level by setting up and managing innovation hubs, enterprise & startup accelerators and digital transformation competence centers.

FGB plays an active role in the public debate by organizing events, seminars and conferences, publishing magazines and book series facilitating in this way the circulation of ideas and the dissemination of research outcomes.

FGB has main offices in Rome and Brussels and field offices in Milan, Turin, Pisa, Barcelona, Ankara and Washington DC.

Activities are carried out by a committed European team with crosscutting capabilities in collaboration with national and international public and private bodies.

Founded in 1971, with more than fortyfive years of experience, FGB has earned reputation by pulling together a broad network of experts and by carrying out its activities independently:

- Research and analysis, data gathering and analysis, forecasting and evaluation;
- Project implementation, dissemination and communication, network management, vocational training;
- Technical assistance to public and private organizations providing training, capacity building, support to the development, policy implementation.