THE EXCELLENCE OF TECHNICAL EDUCATION IN ITALY FROM THE ITI "MONTANI" TO THE ITS ACADEMY IN VIEW OF THE NEW EUROPEAN SCENARIOS OF HIGHER TECHNICAL EDUCATION

L'ECCELLENZA DELL'ISTRUZIONE TECNICA IN ITALIA DALL'ITI "MONTANI" ALLA SUA ACCADEMIA IN VISTA DEI NUOVI SCENARI EUROPEI DELL'ISTRUZIONE TECNICA SUPERIORE

Sandra Chistolini
Roma Tre University
sandra.chistolini@uniroma3.it

Matteo Villanova
Roma Tre University
matteo.villanova@uniroma3.it

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ABSTRACT

Technical education in Italy follows an alternating path marked by moments of marginalization and moments of excellence. Since the first half of the 19th century, the humanistic studies notoriously most appreciated by the state system wrongly occupy almost exclusively the scene of secondary school education, relegating technical training to confined spaces and of low attraction for the youth of the bourgeois elite. The historical event and the cultural relevance of the "Montani" Industrial Technical Institute of Fermo, founded in 1854, represents an important example of how a school located in a non-metropolitan area gradually becomes central to the development of the entire nation.

L'istruzione tecnica in Italia segue un percorso alternato segnato da momenti di emarginazione e momenti di eccellenza. A partire dalla prima metà dell'Ottocento, gli studi umanistici notoriamente più apprezzati dal sistema statale occupano a torto quasi esclusivamente la scena dell'istruzione secondaria, relegando la formazione tecnica a spazi ristretti e di scarsa attrattiva per i giovani delle élite borghesi. La vicenda storica e la rilevanza culturale dell'Istituto Tecnico Industriale "Montani" di Fermo, fondato nel 1854, rappresenta un importante esempio di come una scuola situata in un'area non metropolitana diventi progressivamente centrale per lo sviluppo dell'intera nazione.

KEYWORDS
culture; education; innovation; science; technique
cultura; formazione scolastica; innovazione; scienza; tecnica

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Introduction

In 1854 the Opera Pia Montani was inaugurated with the task of hosting orphans or poor people from the city of Fermo to initiate them into the blacksmithing arts. The initiative was made possible by the conspicuous bequest of Count Girolamo Montani who a few years earlier designated the Opera as his universal heir. In 1861 the Royal Decree of the Commissioner for the Marches Lorenzo Valerio transformed the original philanthropic nucleus into the "Institute of Arts and Crafts for the Marches" with municipal ownership. This is followed by Giovan Battista Carducci's project for a new "Technical-artistic Institute of Fermano for the theoretical-practical teaching of Crafts and Applied Sciences of Fine Arts and Music". The engineer Hippolyte Langlois with the deed of incorporation introduces the programs of the schools of Angers, Chalons and Aix in France, while the engineer Ernest Hallié is dedicated to the construction of the workshops. The two directors are expressly sought out in Paris for their polytechnic experience in the sector which guaranteed the reproduction of the model of the French polytechnic school introduced by Napoleon III (MITI, 2022). Thus began the story of what would become the main reference of technical culture in Italy. The best Institute on the national territory, pride and joy of the whole Region and of the entire country. During the celebration of the 150th anniversary (1854-2004) of the foundation, the idea of making the heritage a museum asset accessible to all was strengthened.

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2**. A long tradition that speaks to the present**

The need for training of mining engineers and geologists in the principles of technology and science receives constant frustrations in post-unification Italy. It is sought abroad and the reason is probably to be found in the fear of the owners of losing the prestige and control of their land to the serious detriment of the economy. The birth of a class of medium-high level technicians was exactly what we wanted to avoid. Politics does not help in this sense despite the obvious

complaints and frequent reports on the urgency of preparing chief miners and chief smelters in suitable schools with theoretical and practical teachings of geometry, drawing, chemistry, metallurgy (Corsi, 2004, pp. 15-20). Carlo Cattaneo (1963) in Milan is committed to the defense of technical and scientific education, he founded "Il Politecnico" (Lacaita, 2012) with the intention of promoting the formation of a social culture of skilled work, thanks to better education, indispensable for the progress of the people (Cattaneo, 2014). Compared to Lombardy which is closer to industrial transformation and to the economic development promoted in Europe, the situation of the Marches, Tuscany and all the Papal States remains linked to an agricultural economy which requires immediate long-awaited transformations. We therefore understand the value of the Fermo Institute which provides fundamental technical training for scientific progress and technological innovation (Bianchi, 2004, pp. 47-60; Pepe, 2012).

As Bruno Belhoste (2004, p. 21), of the University of Paris X writes, the development of technical teaching in France begins from 1750 even if the expression "technical teaching" dates back to 1860. in this field and other countries are attentive to the innovations that come from the French polytechnic school. We therefore understand the reason for finding the figures of well-prepared engineers to import into the Opera Pia to refound it according to ideas of profound change in the applied sciences. With the end of the Ancien Régime and the growth of the influence of the Enlightenment, the same intellectual elite rediscovers the dignity of technical culture which in previous years had not received adequate favors and attention. In the school, both apprenticeship and technical education are valued. The pedagogy of the Encyclopédie supports culture open to all both to the elite and to the people, everyone has the right to education, scientific, literary and artistic culture and everyone must have the opportunity to participate in manual work (Morandi, 2016, p 15). We recall that Giuseppina Pizzigoni was among the first teachers to include manual work in primary school, receiving official recognition: "The school inspector of the time sent me a certificate of merit and a cash prize from the Ministry (L. 30)" (Pizzigoni 1946, 14) with a prize from the Jury of the Educational Exhibition set up on the occasion of the Inauguration of the Sempione Pass International Exhibition in Milan in 1906 (Chistolini, 2022). D'Alambert combines classical humanism and the mechanical arts, Diderot combines precious speculation with practical skills, Condorcet plans the introduction of the mechanical arts in schools and secondary education institutions. The artistic experience and the attempt to overcome local and national provincialism had a strong impact on the ideas of change that spread from France to all of Europe. In post-unification Italy the drive towards technical

education on the French model is experiencing a favorable season with the Casati Law (1859) which recognizes in Title IV this training in the "third branch" of the public education path proceeding with the parallelism between gymnasiums and technical schools , followed by the parallelism between high schools and technical institutes. What is foreseen for the classical studies is resumed in the technical studies (Soldani, 1981, p. 79). Technical schools are free and are considered popular courses. The secondary technical preparation can be completed at the university level with entry into the Royal Technical Institute of Turin and then also of Milan in the construction project.

3. **The opening of MITHS**

The ITI represents an excellence of Italian technical education, an example both of modernity of the educational offer and of industrial archeology for the works preserved in it consisting of testimonies, tools, documents, machinery that show the development over time capable of constantly interacting with innovations coming from outside. The technical heritage and materials of laboratories, workshops and departments have become museum objects in the MITI – Museum of Innovation and Industrial Technology. Historical workshops of the ITI Montani of Fermo. On the MITI website we read "There is no doubt that innovation and technological research have always gone hand in hand with historical events, and for this reason the central fulcrum of the museological project is to tell the evolution of the ITI, drawing parallels with Italian and European historical and political events and at the same time making the visitor understand the current value of knowing how to do with the hands and knowing how to do with the brain. The main idea from which the concept of the MITI Museum was born, therefore, is that of wanting to link the institute and the museum to the concept of scientific evolution and innovation, from research and ideas something new is created that improves quality of work and facilitates human actions. Progress is followed in moments of historical evolution through the events of Montani up to the present day, leaving open the possibility of exploring new areas of research, new discoveries of technology" (MITI, 2022). In addition to the MITI, the ITT Montani Virtual Museum of the Montani Technical and Technological Institute is active, which provides for inserting and commenting on Italy's scientific and technological heritage of the last hundred years of history. The Virtual Museum shows a small part of the vast collection of technical instruments owned by the

School. Fabio Panfili, site curator, writes in the Presentation: “They are not just objects to be viewed with curiosity, but witnesses of a life, silent masters. Montani and its history are identified with its laboratories, its workshops, its equipment and with the tens of thousands of people who have spent part of their lives there. Generations were formed here that spread throughout the world, bringing with them the imprint of the Institute” (Panfili, 2022). The same curator publishes on the site some documents and images of instruments conserved in the Montani Institute Library which allow us to see what the School had in 19 Laboratories, Workshops, Equipment and Instrumentation supplied to the School in 1936 (Panfili, 2022).

The many students who trained at Montani demonstrate with their commitment to work in companies the value of the achievements of science and the progress of technology fueled by the ideal of social improvement for all. The donation of a cultured and enlightened family in favor of poor categories so that their education could be provided morally founded the company and handed over to the generations the baton for the continuation of the work, opening up towards ever wider horizons. Local observers note how an institution has been created which has fulfilled the task of educating the younger generations, and which at the same time has become the driving force behind the diffusion of new technologies and a reference point for Italy's industrial development. In this regard, the President of the Cassa di Risparmio di Fermo Foundation Antonio Grilli comments: “This national prominence has led to a great attraction and entire generations of young people have trained in our school. Thus the way of organizing and living the company learned in this great forge in which the training process was interpreted at every stage as a moment of corporate and industrial life spread throughout Italy and the world. This is how the technicians trained at the ITI of Fermo have been protagonists of the industrial development of our nation and everywhere they have the ability to distinguish themselves and be recognized, distinguishing themselves in applying what they learned in that school of behavior and life that is still breathed in the classrooms, in the workshops and in the corridors of Montani. The training process was not only that of a technical school in which the notions related to production cycles were learned, but also that of preparation for social life, a role in companies and in civil society. This teaching remains in the behavior and lifestyle of those who have had the good fortune to attend this institution, bringing to the world a way of being typical of that school of 'arts and crafts' which in its century and a half of life has positively influenced the many industrial seasons and economic progress of our nation. Today we want to contribute to celebrating the 150th anniversary of the Industrial Technical Institute by retracing

together this long journey made by entire generations in the field of education, instruction and technological progress through the rich documentation, witness of the history of our Institute displayed in the catalog ” (2004, p. 8).

4. **The European scenario of higher technical education**

The pandemic period represented a long interlude of educational emergency, between educational disinvestment and a void of value contents to be filled with an acceleration towards a future that in any case proves to be rich in new projects, to work and therefore to study, with an ever greater need of a more recurring, applicative and organized use of every form of technology. Then it is necessary to start in time a transformation of the places, ways and times of learning for all ages. The concept of life long learning applied more and more precociously, increasingly concerns the technological training aspect rather than the humanistic and global one. The dissemination of scientific and technological culture as a priority necessity must not deprive the possibility of creating at the same time and in parallel a just strengthening of the training aspects considered "useless" in which it could be considered a priority of a productive nature. This reality occurs in part because the places destined for learning are too few and often inaccessible to all due to an atavism of lack of universality of educational access yet to be filled, such as universities and research centres, in part because in fact the disinvestment in training it is also supported by social media and mass media which too often transmit identity-value models based on anything but study and passion for culture, mythologizing footballers, influencers, investors or even illegal people, etc. As is already the case in many countries Europeans, Germany, France, Spain, even the Italian reality needs to build a technological and professional chain that is aimed at training specialized technicians but who do not have gaps in global training and cultural awareness.

Tertiary education understood as a professionalizing training activity is much more widespread in other European countries, while for Italy it remains on parameters yet to be developed. In the European scenario, higher technical training is to all effects and purposes part of the regular education system with permanently dedicated funds. The world of economic activities and business has always been interested in interacting in the active and curricular part by anticipating training needs with repercussions then in the effectiveness of entry into the world of work with effective synergy in the management of planning,

management and control processes of activities didactic then designed and carried out by what should be academic authorities. In fact, for example, the educational qualification issued by the Swiss professional universities is simultaneously recognized in the universities of arts and crafts of Germany and Finland as a valid qualification for the job on a contractual level, according to cantonal, federal or state plans. However, the tendency remains to deepen the technical and technological preparation to the considerable detriment of the basic cultural one, in some cases with a clean break carried out early even without the consent of the pupils, who are "started" precisely according to the performance of the previous years and other decision-making parameters (judgment of the teachers, social background, etc.) to training courses with no return, in a paradigm that sometimes still recalls the dogmatic, totalitarian and no return paths, for which the student embarked on a selective curriculum of studies can no longer go back as in Katharina Rutschky's Schwarze Pedagogik (Perticari, 2015).

By responding to specific needs, there is a risk that educational institutions will respond to criteria of strong specialization and in an ever more restrictive way and less and less inspired by a broader training platform. Instead, it should be ensured that there is continuous exchange and growth with activities located mainly in production areas with a vocation for sectoral growth, favoring alternating training always supported by specialized tutorial figures, perhaps coming from within the companies; the attractiveness of these national and also intra- and extra-European technical-professional opportunities also consists in the fact that they represent post-diploma curricular continuations, as a professionalizing and applicative orientation of the single didactic offer. In Italy there is a tradition and in the last twenty years there have been development plans for IFTS courses, but above all for ITS, i.e. mainly professionalizing tertiary specialization and specialization in the most advanced technologies (ITS). However, a real tertiary system of the technological and professional supply chain has never been created. Certainly, there are some excellences in some regions of Italy with a real development of qualified paths in the strategic areas of the country's development. The "Enrico Fermi" Technological Institute of Frascati (Rome) has been a reference point in Lazio, gathering over time many students who have remained outside the curricular training circuits for various reasons of discomfort and disadvantage and is currently in operation and as an experience in the field of public training has meant a lot and is now affected by legislation to be applied better as we will see later. We then have realities of excellence, such as Salesian Professional Training historically present on the national and international

territory and as an experience that arose more recently in the training needs of the Italian territory the ELIS Center (Rome).

An example of possible excellence in technical and technological training without neglecting the contents of human and civic depth through a vast preparation in basic culture, the ELIS Center was inaugurated in 1965, in the Casal Bruciato district of Rome, in a suburb of the capital . ELIS is an acronym for Education, Work, Education, Sport. These are the four areas in which the mission of this institution is carried out. ELIS trains people at work to offer everyone the possibility of building their own life project. For this reason, it is committed to eliminating the distances that separate young people and the unemployed from highly specialized training, the social periphery from development centres, start-ups from large companies, training systems from the world of work. It implements training programs in the workplace, to transmit skills appropriate to the evolution of the professions. It promotes the human virtues and relational aptitudes of the person, proposing an ideal of work that is an opportunity for growth, at the service of others and for the common good.

In 1987, the NGO ELIS was established to place the training and promotion model developed in the first twenty years of activity in Italy at the service of developing countries. To date he has carried out projects in 21 countries in Africa, Asia and Latin America. In 1992 CONSEL was born, the consortium that today unites ELIS with over 100 large companies and small and medium-sized enterprises in joint projects for the promotion of employment, development and social responsibility. Among these 30 companies listed on the stock exchange for a capitalization of over 2 trillion. In 2004, the ELIS Sports School was born from the first Sports Group, active since the 1960s. Its activities are an integral part of the ELIS training courses and constitute a meeting place for the young people of the neighbourhood. Finally, in 2020 ELIS Innovation Hub was born. It carries out consultancy and technological innovation projects commissioned by companies, involving highly specialized young people in working groups to encourage their professional growth. It is also a business accelerator with services for start-ups. In 2022, as reported in the ELIS 2022 Social Report (with the passion lavished by the Chief Executive Officer Pietro Cum and with specific depth skills, such as Alessandro Turco for the Digital Education-Industry sector, Raffaele Nappi for Institutional Training and Felice Faraglia for the Professional Training Rome, just to name a few of the many operating sectors of a team of excellence) has guided 22,874 people and trained 8,548 of them; carried out 400 courses, masters and talents and 172 innovation projects; involved 420 companies in projects. The

average placement in Italy of 89%. The ELIS experience demonstrates that it is possible to do better and to do more with loving kindness by passing identity-value models into the developmental age as examples of work and life planning. The boundary between public and private agreement does not exist if the educational and training mission is closely shared.

5. **Towards a new integral development of the Person**

From the fallout in the demand for work emerges a significant gap between what is studied and what is then required by the working world and the low number of ITS graduates is surprising, equal to 2,601 in the last year, i.e. only 1 per cent of those enrolled in the tertiary level takes different paths from university ones. As if young Italians did not want to become specialized technicians and therefore it is necessary to increase enrollment in this training opportunity, including post-secondary ones, going from 1% to at least 20% per cent, such as the IUT in France and the German professional schools with 35 % enrolled among all students. Some current data on the student population: ITALY: 24.2% against the benchmark of 40% set by the EU objectives (Europe 2020) UK: 45.8% FRANCE: 41.8% SPAIN: 41.5% EU27: 37, 3% Source: Eurostat. 2014 data (Dordit, 2017). Wanting to understand how the current situation came about, let's recall the term "Good School" with which even today we refer to law 107 of 2015. The objective of this legislative provision was to reaffirm the central role of the school, improve the skills of female students and students, tackle socio-cultural inequalities and prevent early school leaving. The legislation also aimed to create an open school, conceived as a permanent laboratory for research, experimentation and didactic innovation, which would guarantee the right to study and equal opportunities. In the legislative intentions it was supposed to bring about a real school revolution, introducing a new way of seeing education and substantial changes in the administration of schools.

The "Good School" consisted of greater school autonomy, with the necessary financial and operational instruments of its own, under the guidance of the Headmaster. The responsibilities and freedom of the figure of the school head increased considerably thanks to the legislation. The Deans could have chosen the new hires from the local registers, form their own team of collaborators, evaluate the probationary year of the new hires and reward the best teachers. As a guarantee of his work, each "super Dean" would then be evaluated every three

years with the consequent determination of his compensation. Among the possible advantages for teachers and families, the legislation provided for an increase of about 7 more teachers for each school, with a plan of 100,000 hirings designed to put an end to school insecurity and be able to meet the needs of the school of the future. Another advantage for teachers was represented by the Teacher Card, a bonus of 500 euros per year available to teachers to be used for expenses related to professional updating and training. The decree also introduced tax breaks such as deductions for parents who opted for equal schools. These incentives were born to prevent the inequality between rich and poor schools from increasing, but they also sparked considerable debate in Parliament. The biggest changes are those that have concerned teaching. The reform also introduced the PTOF (Three-year plan of the educational offer) which replaced the POF as a curricular, extra-curricular, educational and organizational planning document for individual schools.

Again to facilitate the transition between school and work, this law introduced the much debated alternation between school and work. This is one of the most discussed changes, with the introduction of 400 hours of internship in technical and professional institutes, but only 200 hours in high schools, which can also be carried out during the period of suspension of teaching for holidays where applicable. More recently there has been the approval of the new Framework Law for the reform of Higher Technical Institutes (ITS), 12 July 2022. The Draft Law on the Establishment of the Tertiary System of Higher Technological Education changes the name of the ITS: Institutes " Technological" Superiors, and no longer "Technicians" (Rizzatto, 2022). The ITS must not be confused with the ITIS, i.e. the state technical industrial institutes, which are secondary schools and which the basic text approved by the Chamber brings to the legislative level a discipline that today is largely dictated at the secondary level by the DPCM 25 January 2008 (Guidelines for the reorganization of the IFTS system and the establishment of the ITS). The PNRR has foreseen an extraordinary investment in Higher Technological Institutes (1.5 billion until 2026) conditional, however, on the adoption of a measure to reform the entire sector. The resources amount to over 48 million euros per year starting from 2022 and the current criteria for allocating resources based on an evaluation system elaborated in two Agreements of 2014 and 2015 are substantially confirmed. During the long parliamentary process, the bill has taken on important dimensions: 16 articles, 82 paragraphs, almost eight thousand words and 19 application decrees are also envisaged. A transitional phase of three years has been foreseen. This reform law which baptizes the institutions as "ITS Academy", strongly desired by the industrial sectors of the country and in line

with the indications of the PNRR, represents a step forward for this already structured training sector. Therefore, waiting since 2008 for a reform aimed at the design of job-oriented tertiary courses, advanced and declined for the training of super technicians, to be considered therefore capable of managing high-quality supply chains and processes, so necessary for the development of national productivity . The ITS Academy therefore become fully part of the tertiary system of Higher Technological Education by developing the training offer on macro-areas defined by Decree to which each ITS Academy will have reference.

6. **Conclusions**

It is essential to consider the connectionist perspective through companies, social partners and sector administrations, in the health sector, sustainable mobility, technological innovation, the environment, agriculture, tourism and coordination of the regions. Greater awareness is needed towards a new organization of the higher technical education and training system, in implementation of the National Recovery and Resilience Plan, which redefines the importance of the ethical and deontological mission of the ITS and IFTS. The achievement of all levels of excellence already present for some in Italy and in any case in most of Europe, pertains to a permanent orientation of young people towards technical and technological professions and family information, through multi-year programs including paths to acquire transversal skills and for guidance also in the form of experiential courses. The updating and in-service training of teachers of scientific, technological and technical-professional disciplines of school and professional training in the context of lifelong learning throughout their lives is essential to achieve technology transfer especially to small and medium-sized enterprises.

This ratifies the importance of the ITS Academy as an integral part of the tertiary system of Higher Technological Education to develop the training offer on macro-areas defined by the Decree, i.e. sustainable mobility, new life technologies, new technologies for Made in Italy, energy efficiency, information and communication technologies, innovative technologies for cultural heritage and related activities. Therefore, the identification of the areas of training intervention and their close connection with the objectives of the PNRR is evident, as well as the direct relationship with the territories and the employability trends of the productive fabrics. Primary prevention of affective, sexual and dissocial risk up to the elimination of criminogenesis pass through the more fragile urban and

educational risk areas for the various possible disadvantages (socio-cognitive, socio-educational, intercultural, post-traumatic, etc.) through the 'Technical and technological education as an opportunity for more immediate entry into the working world and the transmission of shared planning contents for productivity, harmony, beauty. Education is this, it is the emotional environment that breathes work, honesty, passion. Humanization and educational planning with reference to an exemplary content to be transmitted such as Value Identity Models (Villanova, 2021) that allow for the creation of belonging, awareness, transcendence by filling in a broad cultural base the gaps that a purely technical approach training could generate. The School with a "technical and technological" setting must therefore not be seen in the dimension of training "shortcuts" but rather as a training and educational incipit which, through integration into practical work, allows greater participation in the parallel acquisition of theoretical contents and broader basic setting aimed at the continuous training of prosociality and active citizenship. Technical training cannot be understood as essential and reductionist, but must even more mean Education to the joy of making and building, sharing a project, even if initially very practical and therefore mainly through manual skills, which then passes more and more, in the sociality and sharing of group, to horizons and Models, even theoretical ones, and to ever wider planning.

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