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Italian Higher Technical Education: Reactive or Proactive Institution in the Skill Ecosystem?

Through an empirical enquiry based on semi-structured interviews with 9 Italian higher technical education providers, this paper tries to show how and to what extent Italian short cycle tertiary education support innovation. The collected results debunk the idea that TVET is fully market-driven, being a rather reactive actor in the interplay with companies. On the contrary, at least in some of the cases reported, it appears to take a proactive role inside skills ecosystems, promoting, within certain limits, the development of new professional profiles.

Keywords

short cycle tertiary education, Italy, innovation, skills' ecosystems, empirical inquiry

1 Context

Higher Technical Education is one of the Italian Recovery and Resilience Plan's main targets. Traditionally marginal within Italy's educational system¹, the so-called *Istruzione tecnologica superiore* (ITS) will receive 1.5 bln € with the explicit aim to double the number of enrolments within 2025². The government's hope is to facilitate the development of the skills required to promote innovation and boost Italian economy, which has been suffering since decades from low productivity rate.

Considering the size of this public investment, it's legitimated to ask: First, if and in which extent Italian ITS has supported innovation so far³; second, whether it is a totally market-driven institution⁴, influenced only by businesses skill's needs and powerful interest groups, or a proactive actor which contributes to the definition of novel professional profiles. Although geographically limited, this inquiry could shed light on the role of short-cycle tertiary education within skills ecosystems also in other countries.

Through an empirical inquiry we will try to clarify these points using the conceptual device of "innovation".

¹ Born in 2008, today they offer 823 courses, having only 21.224 students all around Italy (source: National Institute for Documentation, Innovation and Educational Research).

² Cfr. Governo Italiano. Presidenza del Consiglio dei Ministri, *Piano italiano di ripresa e resilienza*. <https://www.governo.it/sites/governo.it/files/PNRR.pdf>.

³ Italian ITS has been reformed very recently (Law n. 99 15 July 2022), but essential characteristics have not changed.

⁴ ITS providers are foundations participated by companies, whose teaching activities must be held at least for 60% by staff recruited among professionals and internships cannot take less than 35% of the total amount of learning hours (cf. Law n. 99 15 July 2022). Courses take normally four semesters (in few cases six).



2 Theoretical framework

2.1 Innovation as circular, iterative, and distributed process

While literature on academic research describe the creation of new knowledge as an iterative and circular process which cannot be conceived without a specific application context (Gibbons, 1994; Etzkowitz & Leydesdorff, 2000; Chesbrough, 2006), studies on Marshallian industrial districts underline the fact that another type of innovation occur through informal sharing of tacit knowledge normally embedded in companies and workers (Amin & Thrift, 1992; Lundvall & Johnson, 1994).

Both these well-known research lines suggest that innovation may happen only within “systems” (Edquist & Johnson, 1997) or “ecosystems” (Finegold, 1999) of interdependent actors, including firms and educational institutions.

2.2 The skills ecosystem model applied to VET

The authors cited above focus on the relationship between the world of work and academia (universities and research centers), whereas the impact of technical and vocational education and training providers on innovation hasn't found as much attention in the literature. However, the skill-ecosystem model, elaborated by Finegold studying high-tech companies, has been adopted in some Australian and British studies to provide a new way of thinking about and reforming middle skills VET (Dalziel, 2015; Buchanan et al., 2020; Hodgson & Spours, 2016).

The fundamental idea behind the use of this model in the VET policies and research is the following: “The nature of labour demand is far from self-evident. The challenge is not so much to predict specific skill sets which will be needed but rather what capacities and capabilities are best developed now to ensure the country has the capacity to adapt rapidly as circumstances change and, where possible, shape the way jobs are defined” (Buchanan et al, 2017, p. 450). Education should not provide firms the skills they ask for but make firms searching for the right skills.

2.3 The role of educational institutions

To better understand how higher technical education institutions, such Italian ITS foundations, can accomplish this task, it may be useful to consider Vona and Consoli's (2017) reflections on innovation and skill dynamics. As these authors have pointed out, at early stages of technological development knowledge transfer is reliant on the mobility of a few talented individuals. New knowledge is still tacit. Only the purposeful and explicit absorption of practical know-how in the formal education, enhances a process of “knowledge systematization” which helps firms to improve contents and assignments of work tasks and smooths the adoption of technological and organisational innovations. Since novel and mostly tacit knowledge is not well known, educational institutions must take a proactive role in identifying innovations and incorporating them into their curricula to “open up new opportunities by facilitating the translation of that technology to unforeseen contexts of use” (Vona & Consoli, 2017, p. 1408).

In this sense, the “fine-tuning” of existing training and educational programs not only would facilitate the diffusion of skills already identified on the labour market, but also create the demand itself of new skills, which otherwise would remain the subjective property of single talented workers. Equipped with these innovative skills “upper intermediate-skilled” (those typically trained by short-cycle tertiary education) should enhance – we might argue – “incremental innovation”, the gradual improvements of existing work processes and

technologies (Toner, 2011, p. 48)⁵, and the “realised absorptive capacity” of their company, firm’s ability to transform and exploit acquired external knowledge (Mason et alii, 2017, p. 8; Zahra & George, 2002, p. 191)⁶.

3 Empirical inquiry – methodology

Through a first explorative inquiry we have tried to check how and in which extent Italian ITS support innovation. According to our theoretical premises, we have considered the involvement of ITS institutions in the process of “knowledge systematization” and spreading.

Semi-structured interviews have been conducted with key collaborators (teachers, managers, directors, or consultants) of nine Italian ITS foundations, covering almost every technological area currently provided for by the Italian legislation on technical higher education⁷. All interviews will be audio-recorded, fully transcribed and thematic analyzed (Bryman et alii, 2021, pp. 537-541) using MAXQDATA. Before interviewing, study plans have been checked.

Our hope is to make clearer the actual or possible role played within skills ecosystems by higher technical education providers in general and by the Italian ITS foundations in particular, institutions still neglected by Italian scholars, in order to gather useful insights for future education policies not only in Italy but also in other countries (Magni, 2021).

4 Results

Among the cases considered there are three patterns of interaction between ITS foundations and companies in the use of new knowledge and its dissemination. Some institutions take a generally reactive role, simply shaping their courses according to the emerging skills needed by businesses. Others take a more proactive role, participating in the design of professional profiles of those technicians that companies should hire to foster “incremental innovation”.

Close to the first type are three ITS foundations (Biotechnology, Mechanical industry, and Smart mobility) whose courses are designed according to business needs, within the frame of a constant information exchange between companies and educational institutions due to surveys and focus groups periodically conducted among partner enterprises and ongoing communication between enterprises and foundations’ staff (teachers, internships tutors, course managers). “Our course managers ... are constantly in contact with the training managers of some leading company ... this reciprocal exchange is exactly what leads all the things forward, if we find something new and interesting we communicate it to our partners and vice versa, if there is something new in the company environment, which is not a production secret, it is communicated to us and we adapt and then use it from an educational point of view” (Smart mobility). Although dependent on the knowledge provided by some leading companies regarding technological and process innovations, also in this model ITS institutions may transfer new knowledge to businesses, especially small ones.

At least in one case (Energy efficiency), even if courses’ design is based on surveys and focus groups among partner enterprises, new skills trends have been identified and acknowledged first through consultation with experts (research centers, University, professionals) who are not employed by any companies. It should be noticed that the

⁵ The conceptual distinction between “radical” and “incremental innovation” is due to the historian of technology Nathan Rosenberg (1994).

⁶ “Potential absorptive capacity”, instead, makes firm receptive to acquiring and assimilating external knowledge (*ibid.*).

⁷ Biotechnology, Construction, Energy efficiency, Fashion, Food industry, ICT, Mechanical industry, Smart mobility, Tourism. We didn’t manage to interview any foundations active in the area Business services.

foundations here mentioned also provides learning units on biofuels and hydrogen, two technologies not yet established, whose applicability is still controversial.

Two ITS foundations seem to be active promoter of business innovation. One through the provision of specific learning units for the spread of new knowledge and skills. The other even foster what we can call a “systematization” of new knowledge and skills linked to emerging job profiles. In the first case, one institution which provide a course for marketing and internationalization of wooden furniture helps partner companies (usually SMEs) to renovate their business approach: “To digitize the whole aspect of communication but also marketing through e-commerce platforms How did we do that? We recruited experienced freelance professionals keen on social media, multichannel marketing, and communication to teach in our course ... our students ... bring to the companies the knowledge they really need but are not able to acquire alone” (Construction).

In the second case, a new course to become “digital fashion designer” was launched few years ago. This profile didn’t exist yet on the job market. But, after the first edition of the course some companies, that turned to the ITS foundation asking for “traditional” fashion designers, decided to hire these new figures to change their business towards digital modeling. It was not the companies that asked the school to modify its training offer based on a predetermined professional profile, but the opposite. The school anticipated them, having realized the opportunities offered by some cutting-edge technologies: A new 3D clothes modeling software, a special scanner to transfer fabrics characteristics (shine, grain, etc.) to digital models and an application to create avatars of costumers wearing virtual clothes. Considering the possible applications of these new technologies, the study plan was designed collecting the results of a survey conducted among companies and suggestions coming from some consultants. For example, the photography teacher, an established photographer in the fashion industry who has been working for major brands, suggested how to conceive the digital photography teaching unit, because «Using Photoshop to retouch photos for a traditional catalog is one thing, but using it to create realistic 3D renderings is another...» (Fashion).

In all cases taken into considerations, teachers recruited among professionals seem to be key figures in the interplay between the world of work and educational institutions, especially as long as innovation is concerned: “Yesterday I was in Bologna at the national flexography conference. New procedures for managing customer-supplier information exchange through packaging were presented. Currently, nobody applies these procedures, but ISO standards already exist, and they will spread in the coming years. I convey all this knowledge in advance to my students who are now attending the course to become Packaging Specialist” (ICT).

5 Discussion

In the production sectors (Aeronautics, Mechanics, Chemistry), where the use of new technologies directly impacts work processes, ITS curricula’s design appears heavily influenced by the skills needs expressed by some leading companies. In the service sector (Marketing, Hospitality, Fashion design), where the use of new technologies has an indirect impact on work processes, ITS foundations play a more proactive role in defining new job profiles.

In any case, teachers recruited from the world of work are crucial. These hybrid figures act as “bridges” between the production or service sector and ITS foundations for the acquisition of new knowledge, its integration and sometimes its original re-elaboration into study plans, as well as its dissemination among companies which are often not able (or even) to use it.

6 Conclusion

According to the collected data the relation between Italian higher technical education and the world of work is more complex than the simple supply-demand pattern. ITS foundations do not always play a merely passive role in the vocational education and training of future technicians but contribute (with different scale of intensity among institutions) to the definition of innovative professional profiles. In other words, they are active players in the skills ecosystems.

However, the research would certainly require additional investigations, especially into the governance mechanisms of ITS foundations. These institutions have strong interest in preparing employable technicians (the ministerial funding which supports them depends on the employment rate of their graduates), as well as companies have strong interest in hiring people trained according to their immediate needs. In our inquiry we could only rely on interviews which understandably report the most successful examples of synergy between education and job market. We cannot say how relevant these positive examples are in the overall activity of the institutions investigated.

Finally, further studies are also needed to check whether innovation strategies deployed in the Italian ITS are oriented not only to maximizing companies' performance through the preparation of high skilled technicians but also to fostering personal growth of the students involved. According to a broader pedagogical perspective – close to the capability approach developed by A. Sen and M. Nussbaum (Costa, 2013, p. 2018), the best guarantee for economic success is the enhancement of every worker, with his/her own intentionality, creativity and responsibility (Potestio, 2020; Bertagna, 2006).

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