CENTRO SVILUPPO CREATIVO DANILO DOLCI

E-DESIGN

Is Palermo ready for the digital future?

A qualitative research in Palermo and Italy about digital skills, future technologies and the Sicilian labour market as part of the E-DESIGN-Project

Report developed by: Centro per lo Sviluppo Creativo “Danilo Dolci”

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Digital skills are becoming increasingly important in the daily lives of many Europeans as a growing share of personal and professional tasks are carried out exclusively online[1]. They facilitate economic, social and political participation of citizens, but not everyone possesses the skills necessary to be active part of the new "digital age" [2], especially in Southern European countries who systematically underperform in terms of ICT education, advanced digital skills and programming compared to the other Member States[3]. For instance, Italy has the 4th least developed digital market of Europe. Digital skills do not only include technical skills, but also understanding the technology, problem solving and other necessary skills that are a great part of our present but especially future life.

Within this context, the project E-DESIGN – European Digital Education for Social Inclusion and Global Neighbourhood, financed by the Erasmus + program, Key Action 3: social inclusion and common values, was born[4]. The project aims to promote social inclusion and combating social inequality among disadvantaged groups, especially migrants and refugees, through strengthening their digital competences in order to enhance their labour market opportunities and social participation. In this project, 7 partners from 6 European countries will work together for 3 years to create ICT-Training Hotspots that offer learning possibilities to increase digital competences as well as foster social inclusion, and create a sustainable basis for those ICT-Training Hotspots to continue and multiply in the future.

For the project, in the period between March and May 2019, two staff members of the Centro per lo Sviluppo Creativo Danilo Dolci[5] interviewed **14 ICT professionals, researchers** and **teachers** working in IT-firms, fablabs, schools and universities with different levels of responsibility. Organizations that made themselves available for this first round of interviews offer very different kind of services, including software development, data analysis, automation and electronics engineering, design for urban and social innovation, game development, process management, recruiting, applied research and education. Size-wise, many different setups were considered, ranging from a consulting firm with almost 800 employees to an indie group of 3 individuals. Conversations took the form of in-person

[1] European Parliament, June 2018. Motion on education in the digital era: challenges, opportunities and lessons for EU policy design

[2] 43% of the European population does not possess basic digital skills according to Digital Economy and Society Index Report 2019 (https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=59976), based on Eurostat 2017.

[3] Euractiv. INFOGRAPHIC: Digital skills in Europe

[4] www.e-designproject.eu

[5] www.danilodolci.org

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interviews and online questionnaires in Palermo, Eastern Sicily and Northern Italy. As a result, updated information was collected on current and future technologies, professional profiles and related technical skills relevant to the ICT sector, with the aim to identify the entry point to the digital labour market for migrants, refugees and other disadvantaged groups, and structure effective learning offers to meet their education needs, accordingly. Although the variety of ICT sectors considered and the diversity of questionnaires participants and interviewees involved prevent from drawing any definitive conclusions as a result of this qualitative research, responses collected have shown convergence on some important points and, therefore, undeniably provided interesting insights that will be explored in the following sections.

ICT labour market in Sicily

The digitalization of the industrial and the public administration sector is already creating unprecedented job opportunities as the need for new and innovative skills arises both at the local and national levels. When specifically asked about the ICT readiness level in Palermo, a comparison was often made with Catania, and a substantial discrepancy between eastern and western Sicily emerged. This came forward when trying to identify virtuous examples of ICT companies in the region. In the area of Catania, a consolidated network of companies, associations, public and private research organizations created the "Distretto Micro e Nano Sistemi"[6] already in 2008. This consortium includes, and vertically integrates, the main actors of the micro and nanotechnology sector in the region, and specifically deals with micro and nanoelectronics, micro and nanosystems, nanotechnologies and advanced materials. At the same time, a significant number of local internet service providers, such as T.net, Videobank, Telvia and Mandarin, have been seizing on the advantages powered by the advancement of ICT in the last decades, eventually finding their way to the national ICT market. The combination of the two realities has given birth to the so called "Etna Valley"[7], that is the biggest hi-tech cluster in Southern Italy, resulting in cost savings, opportunities and conveniences for business development and durable employment options in the ICT sector. On the contrary, a less favourable scenario can be found in the metropolitan area of Palermo, where the job context is characterized by low recruitment levels - around 45% of young people aged between 15 and 29 years old is unemployed[8] - and a high percentage of young graduates moving abroad, either in bigger cities in

[6] Distretto Tecnologico Sicilia Micro e Nano Sistemi
[7] BiotechinItaly, Etna Valley: The Scientific Park of Sicily Region
[8] ISTAT, 2018

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Northern Italy or in other European countries, in the attempt to enter the (digital) labour market. Digital and telecoms professions in Palermo are less attractive for potential candidates due to the frequent underestimation of the value of digital services offered by both specialised and non-specialised firms (e.g. software development, cyber security, database management, etc.), low wages and limited opportunities for professional and career growth. At this respect, conversations held for the interviews have been crucial to understand that fragmentation of existing ICT-based learning offers in Palermo as well as major constraints such as the limited availability of funding and equipment, poor school networks and teachers' professional development preclude the attainment of an adequate level of digital competences requested to enter the ICT professional world, especially for the project's target group. Based on this, it can be argued there is space to partially address these shortcomings in the short-term by complementing existing ICT-based learning offers through ICT courses tailored to the capacity and the needs of people with a migrant background and other disadvantaged groups living in the city of Palermo.

To understand the situation in Palermo more in-depth, the following sections focus on the difficulties in hiring new employees according to employers in the different companies, the key technologies and key technical competences for the future, and the existing learning offers in Palermo that exist today.

What skills do employers look for?

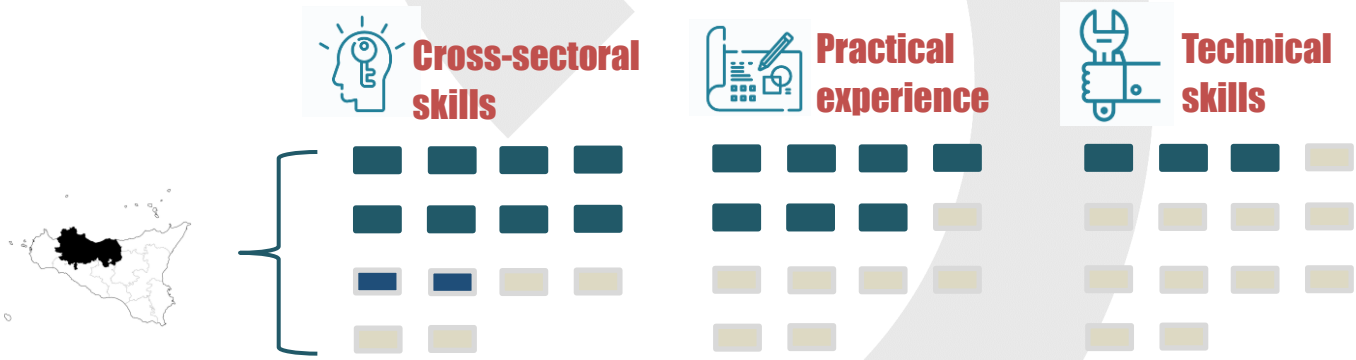

Figure 1: Major problems when hiring potential candidates according to 14 responses collected (IT firms; Schools; Fablabs; Universities)

Our findings revealed that one of the biggest challenges when it comes to hiring new staff members is to attract candidates with **strong soft skills** and a **problem-solving attitude** rather than specific technical skills. According to 10 out of 14 responses received, in fact, the relentless pace of change in the ICT industry requires flexibility, adaptability and mental elasticity of potential candidates. For

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example, interviewees stressed the importance and preference of a candidate who is flexible, knows how to learn new things and who is able to adapt to change quickly, rather than a candidate who is very specialized in one field, with a strong academic background an specific technical skills and therefore less flexible and versatile. The reason behind this preference could be that digital businesses in Palermo are not so specialized, meaning the demand for highly technical, quantifiable and standardized skills seems to be lower than the one for general technical competences and soft skills. Although a certain basis of hard skills is still needed, the modern workplace in Palermo seems to be all about negotiating, compromising and communicating, even in the ICT sector. Although maybe specific for the context in Palermo, these soft skills in combination with technical skills, is in line with the European definition of digital skills, which involve a range of abilities necessary for the use of digital devices, including both technical qualification and communicative-emotional capacities.[9]

In addition, the **lack of previous practical experience** and the **limited ability to put technical skills into practice** are often mentioned as further obstacles to recruiting. On the contrary, only 2 firms struggle to find suitable candidates with deep technical skills needed to be fully integrated in a specific internal department. This circumstance could be the logical consequence of the different structures that ICT companies may have: the more specialised the business is, the more specific the service offered is, the fewer transversal competences are required.

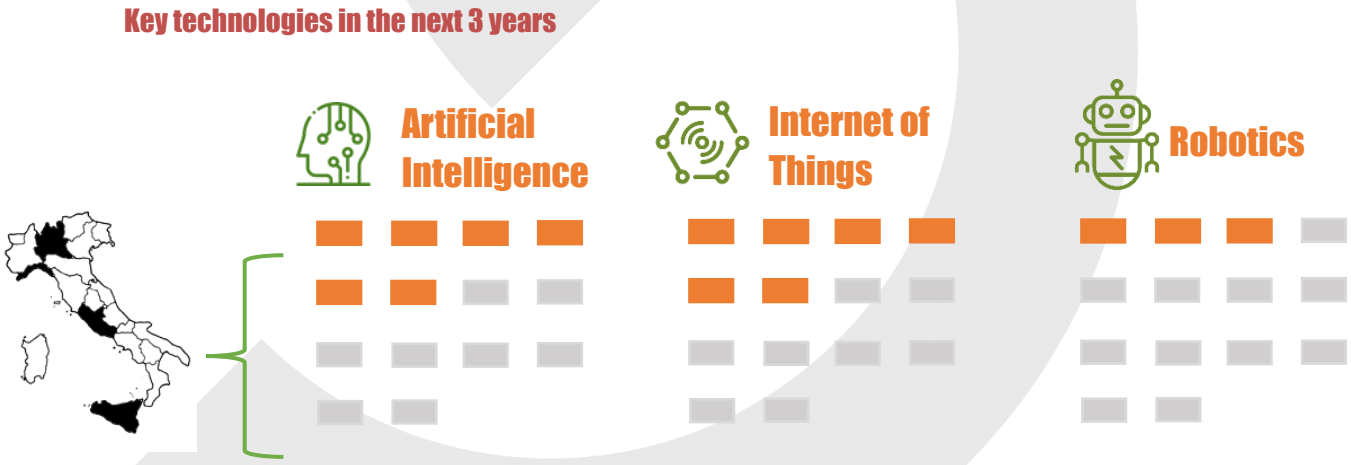

Figure 2: Top three technologies in the next 36 months according to 14 responses collected (IT firms; Schools; Universities)

[9] European Parliamentary Research Service (EPRS), January 2017. Digital skills in the EU labour market.

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When asked for views on key technologies that will increasingly stimulate innovation within the ICT industry in the next 3 years while creating new value streams for consumers, industries and society, responses were diverse, surely due to the different types of companies, institutions and fields of ICT that were included in the interviews. Interestingly, some common technologies were pointed out which can give us some indication of what the future might bring. **Artificial Intelligence** (AI) has been the most widely mentioned during interviews because of its potential to dramatically enhance the performance of communications, apps, content, and digital commerce. IT firms also argue AI greatly streamlines work flow and processes, and accelerates profitability for smart workplace investments. Likewise, **Internet of Things** (IoT) will increasingly be needed, especially in auditing/consultancy and services, bearing in mind connected objects and complex systems bring many skills into play ranging from electronics to programming via integration and energy optimization. According to responses received, **Robotics** can be classified another important technology for the near future thanks to significant and progressive technological advancements in this field. Nowadays, robots are smaller, cheaper, more practical and cost-effective than never before. Being used in workplaces as diverse as automobile plants, laboratories, warehouses, energy plants, hospitals, schools and many others, they are versatile resources that will be extensively used for both production and education purposes.

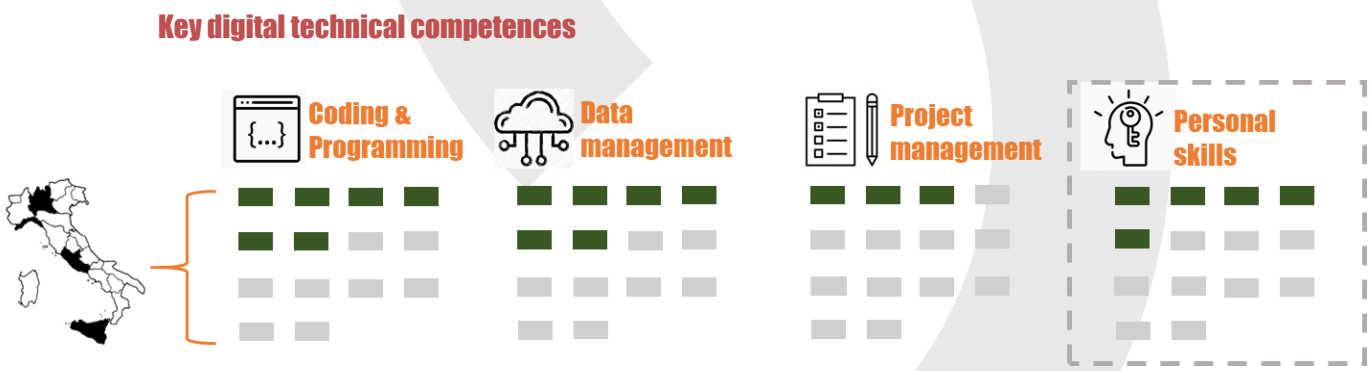

Figure 3: Top three most needed technical skills of digital job applicants according to 14 responses collected (IT firms; Schools; Universities)

Respondents were also asked to share visions on which specific technical competences are required from ICT professionals to meet current demand on the labour market. Due to the great diversity of businesses and schools involved during this first round of interviews, answers received were again highly heterogenous, making it impossible to have a clear vision of what the state of the arts is, if there even is one. Nevertheless, it is possible to get an idea of it based on the most frequently mentioned technical competences.

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According to our assessment, sound **knowledge of programming languages** and **procedural coding** is a very valuable competence in the ICT sector since almost everything in the modern world is built-in programmed. Programming is an extremely creative process and a logic-based activity that habituates our mind to thinking in a sensible, rational and common-sense manner, involving the use of rules-based logic when making decisions. On the technical side, programming allows to reap the benefits of emerging technologies like AI, IoT and robotics, enabling interaction with machines and computers, tasks automation and creation of intelligent machines. **Data analysis and management skills** will also be sought after, given the unprecedented amount of data being collected, studied and used daily, and the inability of normal database technologies to adequately process them. Building up such expertise enables businesses to enhance the delivery of the highest levels of data quality and accuracy, addressing the need for data security and confidentiality. In addition, the ability to pull from and work with data from multiple sources through data integration gives organizations the chance to create blended combinations of data that are ultimately more useful for making decisions**.** Among key e-competences required to enter the digital labour market, 4 firms and 1 school also identified **project planning and management** as a fundamental aspect of ICT projects. It relates to the use of schedules such as GANTT charts and other tools to plan and subsequently report progress within the project environment, and allows for an accurate organization, securitization and management of available resources to achieve set objectives. This specific competence is of paramount importance when it comes to address business needs and effectively define the activities that will occur throughout the project's entire lifespan.

It is worth mentioning a considerable number of entities surveyed transversally stressed the importance of **soft skills** (i.e. complex problem solving, elasticity, ability to interact with heterogeneous multiracial work groups), even if asked about the technical competences employers in the ICT sector tend to opt for. It can thus be concluded that employers value soft skills as much as hard skills.

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ICT learning offers in Palermo

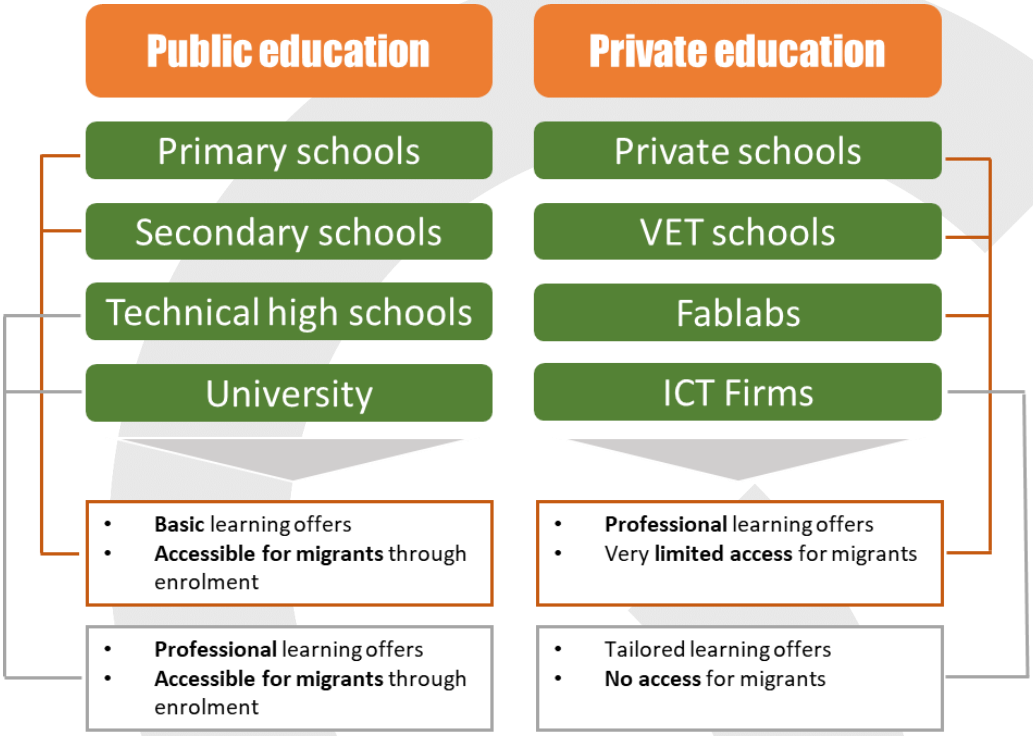

Figure 4: Landscape of ICT learning offers provided by the public and private sectors in the metropolitan area of Palermo

As the E-DESIGN project aims to complement the current learning offer in ICT, a part of the research was dedicated to understanding the situation of educational offers in Palermo. Here, learning offers in the ICT field can be seen on different levels: basic ICT courses are offered at primary and secondary public schools, specific technical high schools, university courses and dedicated degrees such as informatics or engineering, and private learning offers in adult education, including ICT courses within companies to increase employees' skills, a Fablab, dedicated ICT courses centres or ICT courses at a more general VET school among many other "practical" courses.

At a public school level, ICT-based learning offers are not systematically integrated into official curricula, with the exception of above mentioned technical secondary schools, and are usually provided for a limited period of time during the academic year as extracurricular activities. Specifically,

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while in primary schools the emphasis is placed on the concept of digital literacy, the development of basic ICT skills such as Word processing essentials and basic computer knowledge for web management shapes secondary schools programs. The target group consists of students aged between 6 and 18 years old, and ideally includes migrants and disadvantaged groups as access to courses is subjected to enrolment.

At university level, a few curricula have a considerable focus on ICT-based concepts and methods, namely engineering and mathematics. These curricula combine theoretical and practical knowledge, and their learning offer includes computer science, data structure and algorithm, operating systems, database management, software engineering, and different laboratories on open data management, digital images analysis and processors architecture, among others. This is seen as the main learning path when learning programming or other ICT related competences, although the kind of education that is given in Universities is often pointed out as one of the major problems companies have with recent graduates. The reasons behind the negative perception of the quality of education are: much of the learning is not completely up to date as teachers are often only teachers and do not work in the field, and very traditional and mainly theoretical study programme offered by universities does not allow for all-round programmers or interdisciplinary professionals.

With respect to private education in the ICT sector, there are numerous schools and entities addressing the needs for continuous skills updating of different target groups. Firms are usually not fully satisfied with the levels of competences of their employees in terms of academic background and soft skills, and often require their employees to attend professional trainings offered by private schools. In rare cases, in-house training is provided by firms with structured HR departments. Modules may include advanced programming languages, software development, 3d modelling and database management. Furthermore, private schools offer a wide range of courses, from beginning to advanced level of ICT subjects, for adults and unemployed people. These courses can be part of a more general VET centre offering various (practical) courses, or part of a specialized ICT education centre (see the question on coding schools).

Regarding the extent to which ICT learning offers in Palermo address the educational needs of migrants and disadvantaged groups, it can be argued that no existing courses are specifically designed to promote their personal and professional development. Even if these courses are quite diverse and cover almost the entire spectrum of digital notions and sectors, ranging from the simplest to the most complex ones, economic and communication issues are not adequately taken into account. ICT courses are usually expensive which therefore excludes who can’t afford to pay such high fees given their poor

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economic situation, and are also entirely taught in Italian, significantly limiting migrants' understanding, especially for recent residents.

Conclusion

The advancements in the ICT industry fuel the global economy, international trade, communication and services across all sectors. Against the ongoing digital transformation of EU business and society, this report assesses current and future developments in the sector at the local level, placing emphasis on emerging technologies, professional profiles and related digital skills. The demand for new types of skills highlights the need to reskill and reemploy the current workforce, allowing businesses and governments to benefit from the opportunities of digitalization. This is particularly true for Southern European countries, that are struggling to keep the pace with the evolution of technologies and digital innovation underway. In Italy, where only 1 in 5 teachers have ever taken any training in digital literacy and 24 % of schools still lack coding courses, more than half of the population lacks basic digital skills[10], and this gap is even wider in Southern regions including Sicily. At this respect, even if results obtained through this qualitative research are highly diverse and impede to reach satisfactory conclusions, the report sheds light on shortcomings in digital education and professionalization that need to be addressed at the local level as well as some positive aspects that must be enhanced to take full advantage of the many opportunities that can arise from the development of the ICT industry.

In Palermo, where almost half of young people between 15 and 29 years old - including refugees and migrants - is exposed to the risk of marginalization because of the poor labour market outcomes and the lack of adequate social integration processes, investing in and facilitating access to digital education can help reduce the risk for our target group of being mere spectators of this digital age and being left out of the labour market. Responses received highlighted also the need for existing learning offers to be complemented by ICT-based courses designed in a way that can satisfy the specific requirements of businesses while taking into account the particular constraints disadvantaged groups face in their daily life. To this aim and based on the valuable information collected, learning offers must ensure the acquirement of basic technical digital competences the project's target group will be able to build on in order to personalize the professional profile of each individual. Additionally, responses received stressed the paramount importance soft skills such as flexibility, design thinking, mental

[10] Digital Economy and Society Index (DESI), 2019. Country report: Italy

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elasticity and problem-solving have for potential employers in the ICT who recognize them at least as important as the technical ones.

The E-DESIGN project will install 4 ICT-Training Hotspots in Palermo in the upcoming three years, which will make each offer different, free, ICT-related courses. The offers' structure will ensure participants are not directly instructed and passively absorb the content of the courses, but they have to analyse specific problems in groups, identify possible solutions and elaborate a plan of action. As such, participants will be encouraged to cope with ICT-based challenges together, and taught how to fail and deal with frustration. Cooperation among groups will provide them not only with the possibility to practice those crucial soft skills required to enter the labour market, but also to establish personal relationships inspired by mutual understanding and respect, eventually promoting social inclusion.

To stay updated about the progress of the project, the ICT-Training Hotspots and the course offers, please follow the Facebook page, the project official website, or write an email to Vidjaya.thelen@danilodolci.org.

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