

The role of the Vocational Education and Training (VET) workers in IT firms

Executive summary



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The report [*The role of the Vocational Education and Training \(VET\) workers in IT*](#) aims to further reflect on the role of individuals with VET studies in digital firms in the current and future context. To do this, the voice of 30 digital firms is collected.

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1. The relevance of VET workers

- VET profiles are perceived as very relevant both currently and in the future development of KIBS.
- On average, half of the people employed in KIBS come from the VET system.
- The vast majority of employers report that, despite having access to VET candidates, they continue to struggle to find employees.
- Subsequently, once vacancies have been filled in response to this demand, companies find it difficult to retain employees, who, due to the dynamic nature of the sector, receive multiple job offers.
- This lack of candidates has led some companies to relocate part of their activity, moving away from large national business centers such as Madrid or Barcelona to municipalities with a direct connection to VET centers.



2. Technical and transversal skills

- In general, candidates enter companies with a satisfactory level of transversal and technical skills (average rating of 6 on a scale of 1 to 10).
- In the case of technical skills, employers indicate that candidates arrive with a general level of knowledge which has to be adapted to the work carried out in the company. This is partly understood as a natural process since it is assumed that the VET system cannot provide highly specialized knowledge.
- The transversal skills that require the most attention in VET profiles are related to project management and teamwork skills.
- One skill that IT firms consider essential is the ability and willingness to renew knowledge. In such a dynamic economic sector, employees of IT firms need to constantly update their skill set. The ability to continue learning is highly valued and marks the difference between individuals in the sector, regardless of the employee's educational background (university degree, vocational training or other).

- Another skill in which deficiencies are detected is in English proficiency. Some of these companies are multinational endeavors that have to interact with colleagues and clients from other countries.

3. Most relevant knowledge areas for VET workers in IT firms

- The role of vocational training is considered essential in most knowledge areas. Of the 22 areas on the list, 13 were identified as important in the short term. The areas of knowledge that employers consider most important coincide with the more relevant areas in the short term

	Areas of knowledge	Score
1	Deployment and operation of software in the cloud (Kubernetes, Docker, IaaS, PaaS, AWS, Azure, Heroku, Google...)	3.8
2	Front-end web development (HTML, CSS, Javascript, Typescript, UX/UI, React, Vue.js, Angular, Aurelia,...)	3.7
3	Design and implementation of databases (SQL, MySQL, ORACLE, SQL Server...)	3.7
4	Back-end web development (PHP, JSP, ASP, HTML,...)	3.6
5	Microservices and server-less architectures (REST, Swagger, AWS Lambda)	3.4
6	Cybersecurity	3.3
7	Testing techniques and test driven development (JUnit, JMeter, Gatling, Karma, Puppeteer, Selenium,...)	3.3
8	Developments in .NET and/or Java EE platforms (C#, VB.NET, F#, ASP.NET, JSP, Java...)	3.2
9	Development of applications for mobile devices (Kotlin, ObjectiveC, Swift, Xamarin, React Native, Ionic, PhoneGap...)	3
10	Administration of application servers and internet services (Apache, nginx, mail, server configuration...)	3
11	Management and planning of IT projects with agile or traditional methodologies (Scrum, Kanban, XP, FDD, PMBOK, PRINCE2...)	3
12	Data engineering (Spark, Hadoop, Kafka, Scala...)	3
13	Secure software development. Strategic code analysis (Sonarqube, Qradar), code injection testing (XSS, SQL Injection,...)	3
14	Data science (Keras, Tensorflow, R, Python, BigML...)	2.9
15	Audit and security management (ISO27K, ISACA -CISA-, CEH, GDPR compliance...)	2.6
16	Internet of things (Sensors, Edge Computing, Embedded, Cloud Storage, Arduino, RaspberryPi, BeagleBone, C, C++, Zigbee, Z-Wave, LoRaWan, BLE (Bluetooth Low Energy), 802.11ax (WiFi), 6LoWPAN)	2.4
17	Management and configuration of ERPs (Salesforce, SAP/ABAP, Oracle,...)	2.4
18	Virtual and augmented reality	2.2
19	5G Network	1.9
20	BIM (Building information modeling)	1.7
21	Quantum computing	1.7
22	3D printing	1.5

- In this sense, the education system should try to cover different time periods, going beyond the immediate needs of companies. Companies are often biased by their own “production urgency”, attaching great importance to the technologies they are currently developing for their technological solutions. If an education system is to prove innovative and generate meaningful talent for the different productive areas that are important in the medium to long term, it must take this into account.

4. Organizational structure in technological firms and the complementarity between VET workers and other workers

- VET candidates are hired by organizations that are generally more horizontal and dynamic than traditional companies, developing tasks primarily in areas as Software Developers and Front-End Developers.
- The differences between VET and university profiles are visible at the beginning of the candidate’s professional career, where VET profiles are perceived as having less ambition and capacity for abstract thinking when it comes to tackling their first challenges. However, most companies do not consider the type of studies as a selection criterion.
- It is generally recognized that the career paths of VET and university profiles within companies tend to level out over time, and both have the opportunity to progress to project management positions. Progression is determined by each individual's ability to learn.
- This issue raises at least two reflections. On the one hand, it highlights a mismatch between the educational system and digital companies. With all of the nuances that exist, the fact that a person with a four-year university degree starts in a similar position and has the same opportunities for promotion within the company as a person with a two-year VET cycle is an indicator of this discrepancy. Another hypothesis is that the organization of work in an emerging sector such as the digital field has not yet managed to create sophisticated organizational charts that clearly differentiate technical occupations and their associated tasks.

5. Possible areas of action to address the discrepancy and final remarks

- One of the aims of the VET system is to develop the skills that students need to access a successful working life. In this context, incorporating specific knowledge related to digital companies into the curriculum may be an effective strategy. This knowledge could be incorporated through existing tools, such as specialization courses or specialization programs.
- It seems clear that the educational system both at university and VET level does not respond to the employment needs and demands of this emerging sector. On the one hand, the system is unable to train the number of people required to cover the vacancies generated by the sector, and on the other hand, it cannot meet the challenge of creating appropriate training content due to the dynamic nature of the sector.
- IT firms currently work with highly qualified workers (university and upper level VET profiles). In this context, another aspect that should be explored is whether other less qualified profiles, such as intermediate level VET workers or individuals with other professional training could respond to the demand for employees. This could give companies a wider range of potential employees, and allow other types of profiles to access a thriving sector.
- A further aspect that has not been addressed in the report, but which will be decisive in the coming years, is the masculinization of the sector. The urgency of promoting equal access to quality employment for women in the sector is a challenge that needs to be addressed, and could clearly have a positive impact on the number of available workers.

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