

Digital Talent Overview 2019

About Mobile World Capital Barcelona



Mobile World Capital Barcelona is an initiative driving the digital advancement of society while helping improve people’s lives globally.

With the support of the public and private sector, MWCcapital focuses on four areas: the acceleration of **innovation** through digital entrepreneurship, the **transformation** of industries through digital **technology**, the rise of digital **talent** among new generations and professionals, and the reflection on the impact of technology in our **society**. Collectively, our programmes are positively transforming the economy, education and society.

MWCcapital hosts MWC in Barcelona and founded 4 Years From Now (4YFN), the startup business platform, present at MWC events around the world.

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Global trends **of digital talent**



Digital talent: the gap between supply and demand is growing

The digital transformation of the economy increases demand for digital talent to cover current jobs and those created as new, and especially related to the technologies of the 4th industrial revolution, such as Artificial Intelligence, additive manufacturing, Big Data and The Internet of Things, among others.

This demand for digital talent is not being met. Despite the fact that the number of European digital professionals grew by 4% in 2018, there is a shortage of digital talent worldwide and it is estimated that the gap between supply and demand will increase over the coming years.

900.000 vacancies for digital jobs in Europe by 2020

65% of all European children will have jobs that do not exist today

80% of all Spaniards between the ages of 20 and 30 who find work in the near future will be in emerging jobs or jobs that do not exist at present. Most will be related to digital talent.

Sources:
European Commission Report E-Skills for Jobs in Europe
Digital Startup Ecosystem Overview 2017

Supply of digital talent in Europe

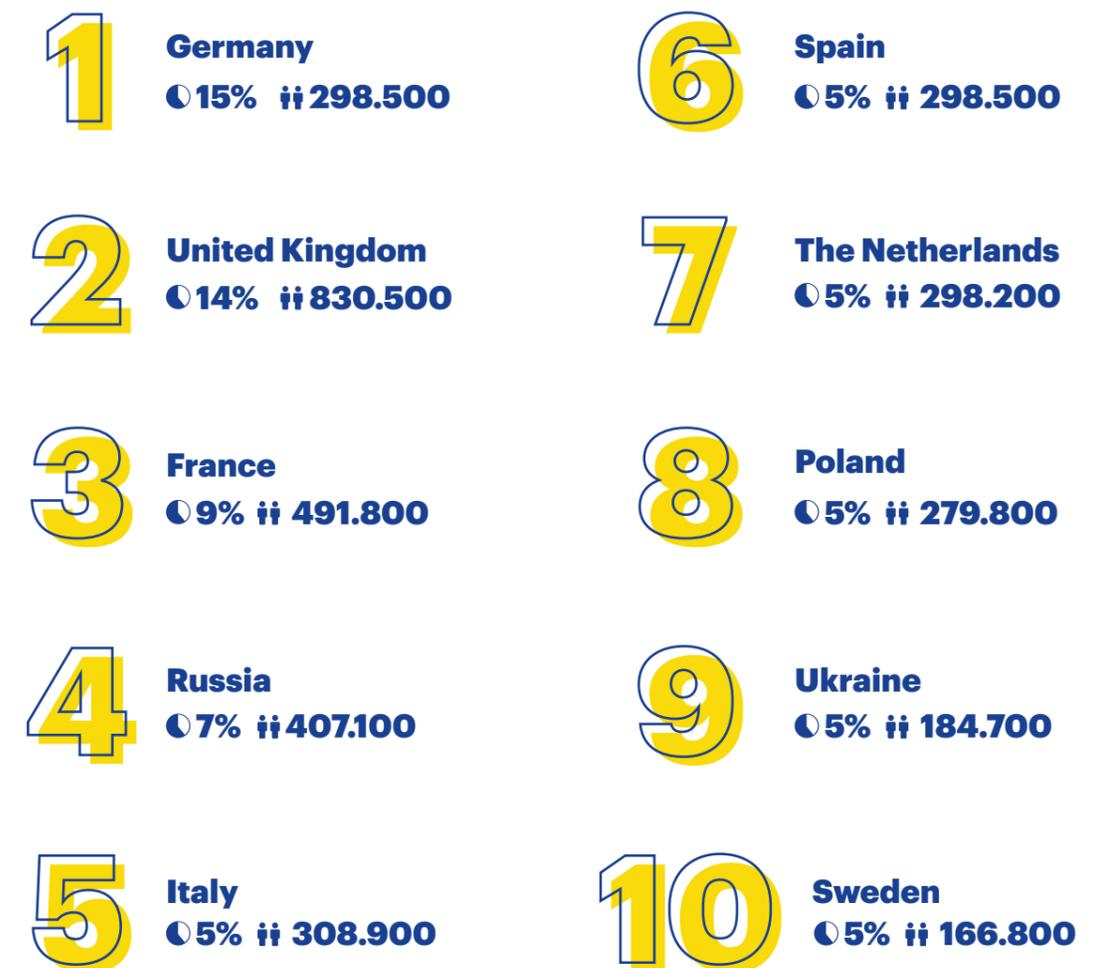
The European ecosystem of digital talent is more interconnected than ever, with 5.7 million professional developers in 2018, 200,000 more than the previous year. However, this supply will not meet the demand for digital talent and the gap is forecast to increase over coming years.

Germany and the United Kingdom are the countries with most professional developers. Spain, with 308,500, is in sixth place behind Russia and Italy.

Countries with the highest population of professional developers (2018)

Total number of professionals
 Percentage representing the European total

<+>



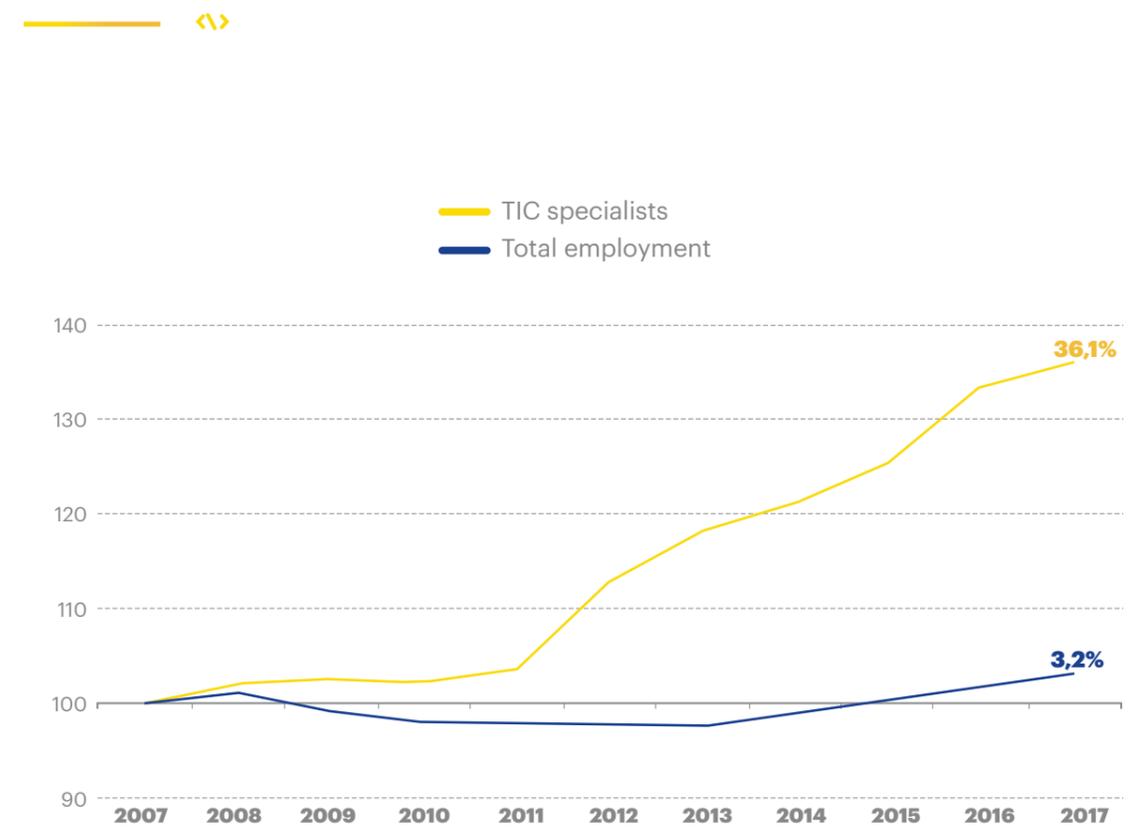
Source:
Atomico. The State of European Tech

Demand for digital talent in Europe

An increasing amount of digital talent is required: all European Union countries have increased employment related to digital skills over recent years.

The demand for professionals with digital skills in Europe has grown by 36.1% compared with 3.2% regarding the remaining demand for professionals.

Number of people employed in TIC specialist positions and other occupations, UE-18, 2007 - 2017 (2017 = 100)



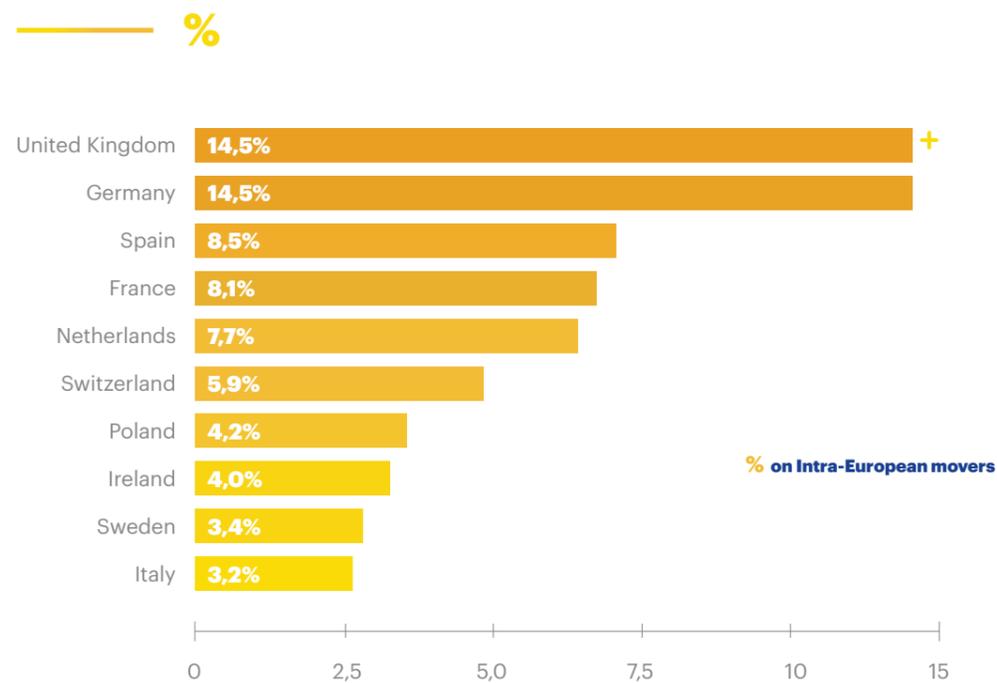
Source: Eurostat (Online data codes: isoc_sks_itspt and lfsa_egan)

High mobility of digital talent in Europe

Graduates in studies associated to the digital sector grow steadily in Europe and the United States since 2000.

Spain is the third most popular destination for European tech talent, after the United Kingdom, which stands first, and Germany.

Main European destinations welcoming European tech talent, 2018

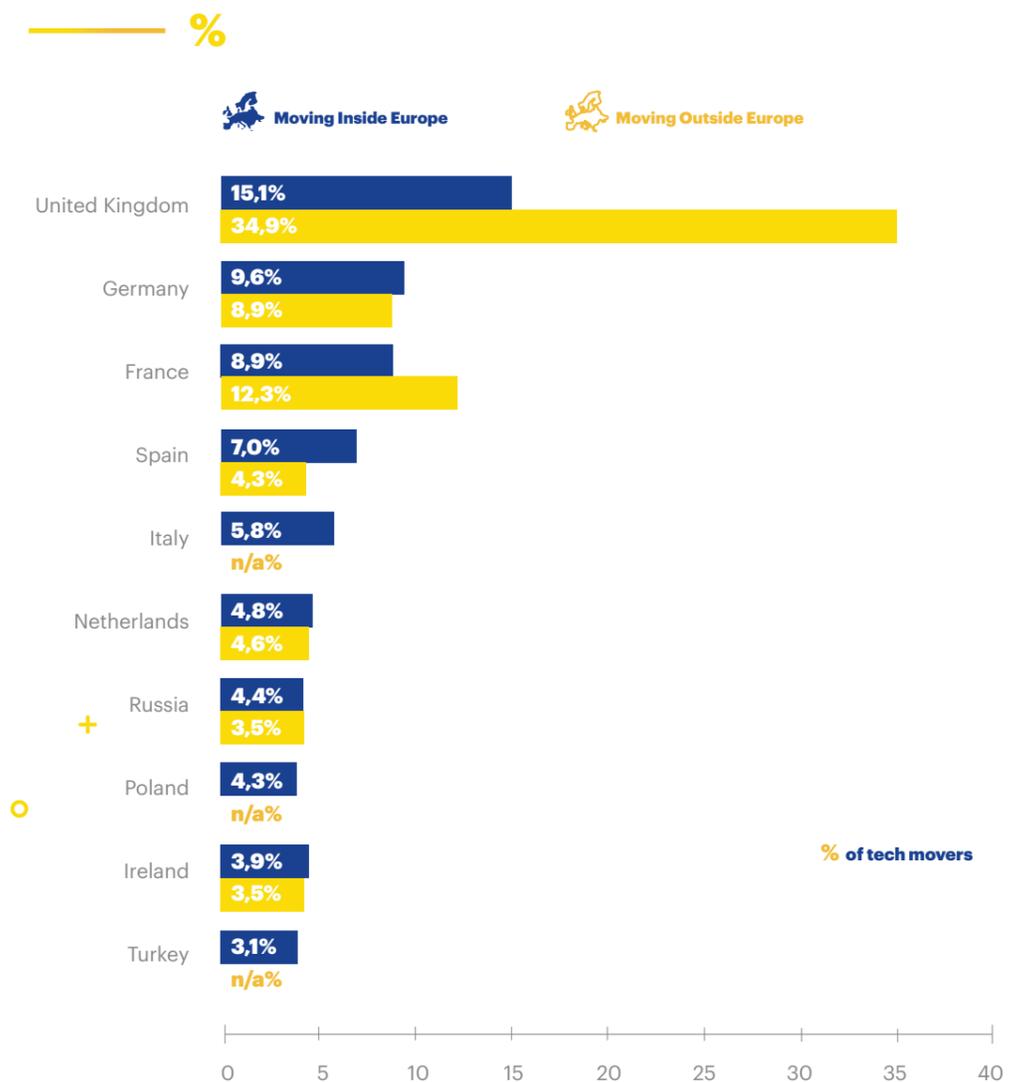


Source: Atomico. The State of European Tech 2018

Spain is an important source of talent for other digital innovation hubs in Europe: it is the fourth exporter of talent.

The United Kingdom is the main exporter of digital talent, both inside and outside the European Union.

Main European countries exporting digital talent

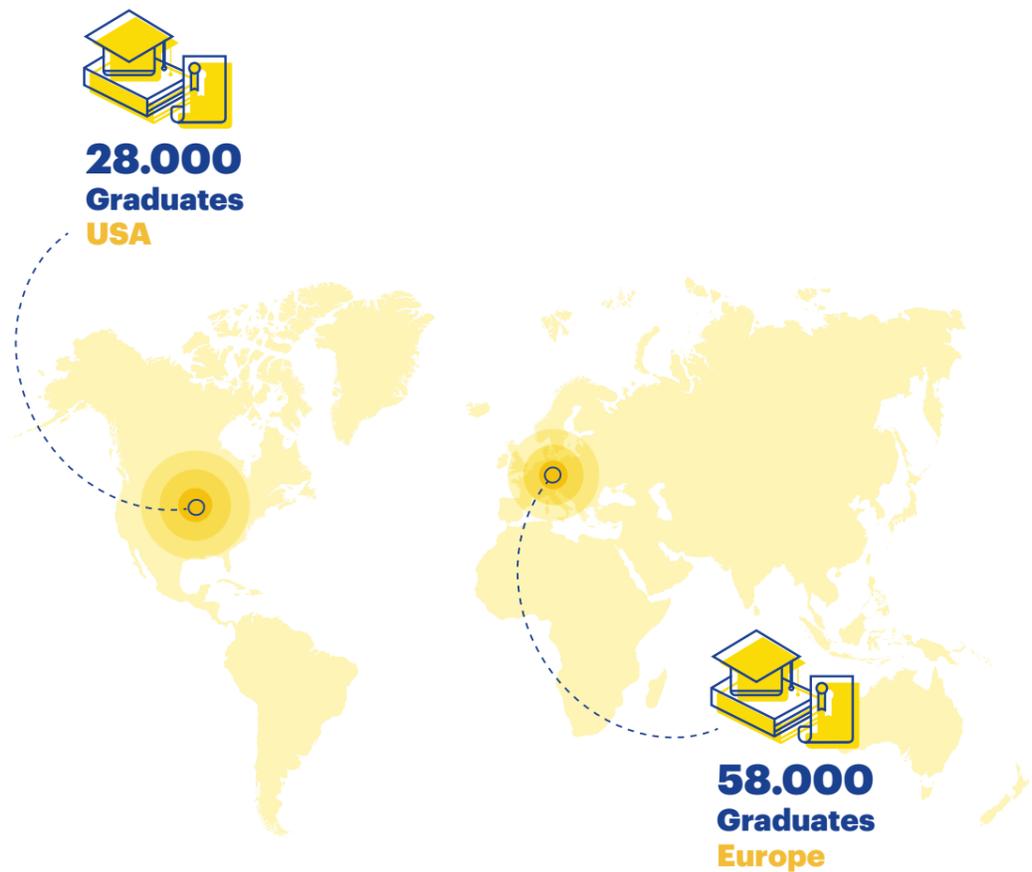


Source: Atomico. The State of European Tech. 2018

Digital training

The number of graduates in studies linked to the digital sector has been constantly growing in Europe and the United States since the year 2000.

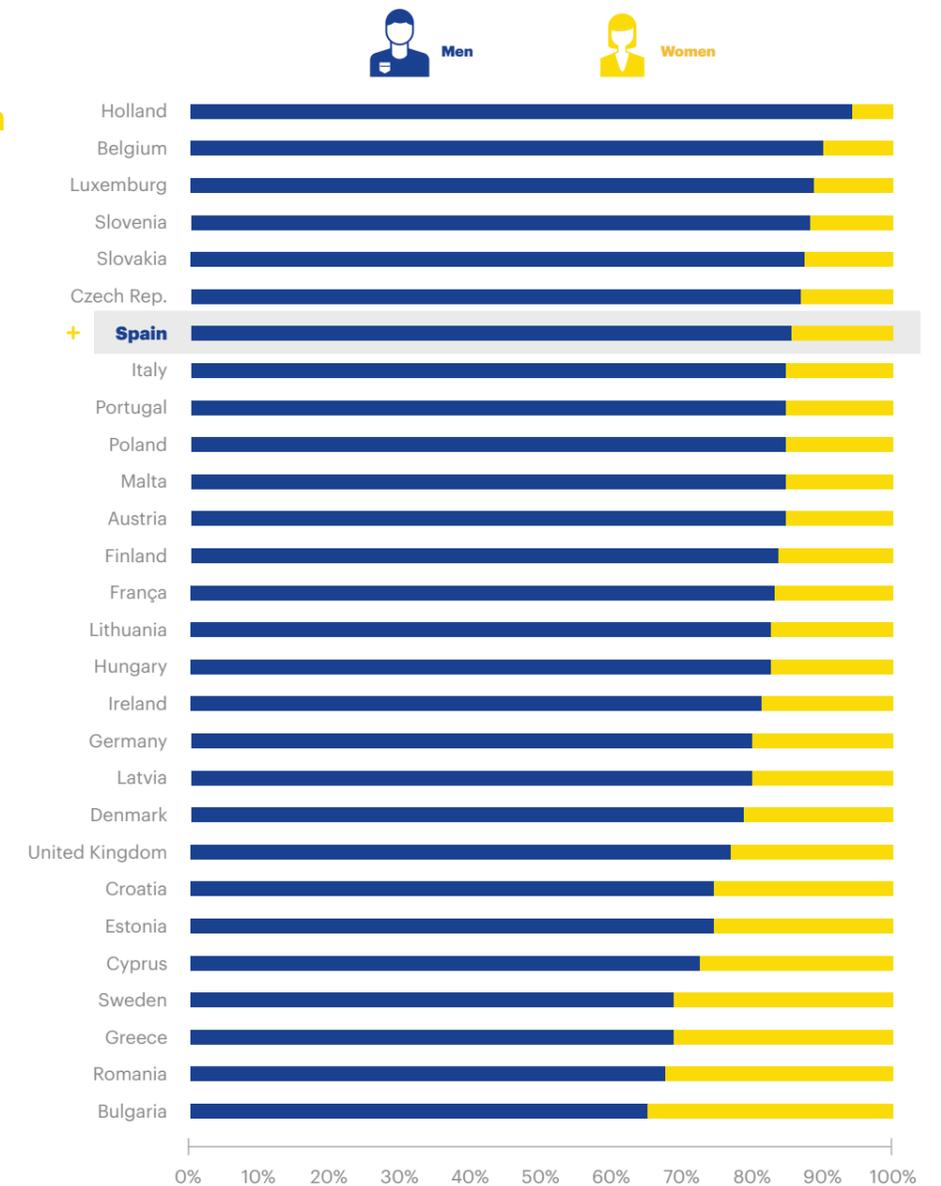
Over 58,000 graduates in ICT studies were recorded in Europe in 2014, and more than 28,000 in the United States.



Training of women in higher education ICT courses in Europe accounts for 17% of the total (2016). The situation is trickier in Spain, as women with higher education ICT studies account for 12.7%.

Distribution of ICT students by sex in the European Union (2016)

%



The growth of Bootcamps, centres that offer digital training in line with market requirements in a flexible and constantly transforming manner, must be noted. This training is not usually counted but does have an impact on ICT training.

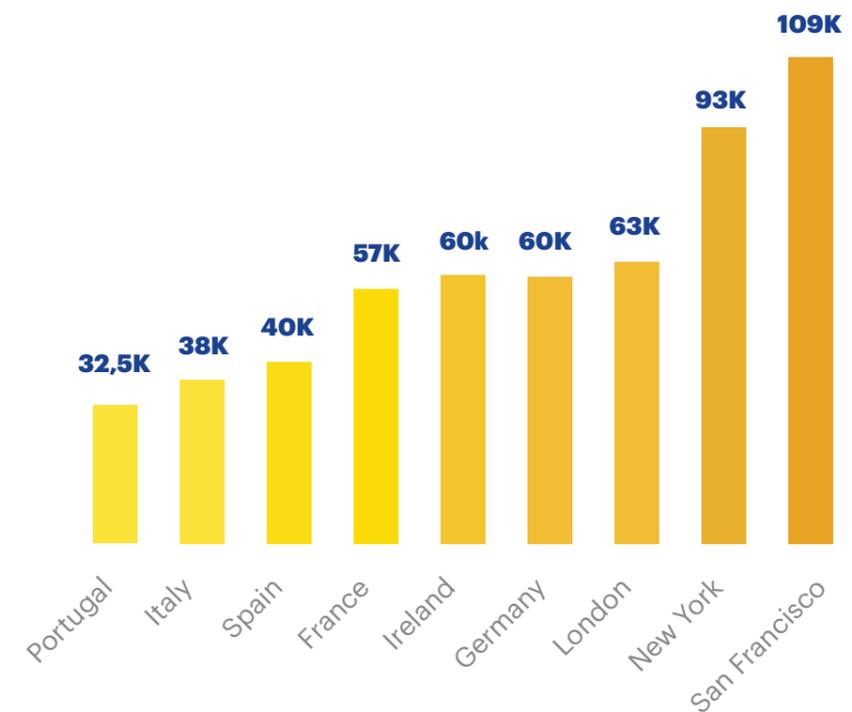
Source:
State of European Tech 2017
Eurostat, 2018b
Mujeres en la economía digital en España 2018. DigitalES.

Remuneration for digital talent is extremely varied in Europe

San Francisco and New York are the cities offering the highest salaries to their digital professionals, followed at a distance by London and cities in Germany and Ireland, who offer the highest salaries in Europe.

Salaries in Spain are highly competitive in relation to other countries and hubs of reference.

Salary of a senior software engineer
— € /year



Source: Atómico, Glassdoor, Startup Genome

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**The digital
professional
of the future**

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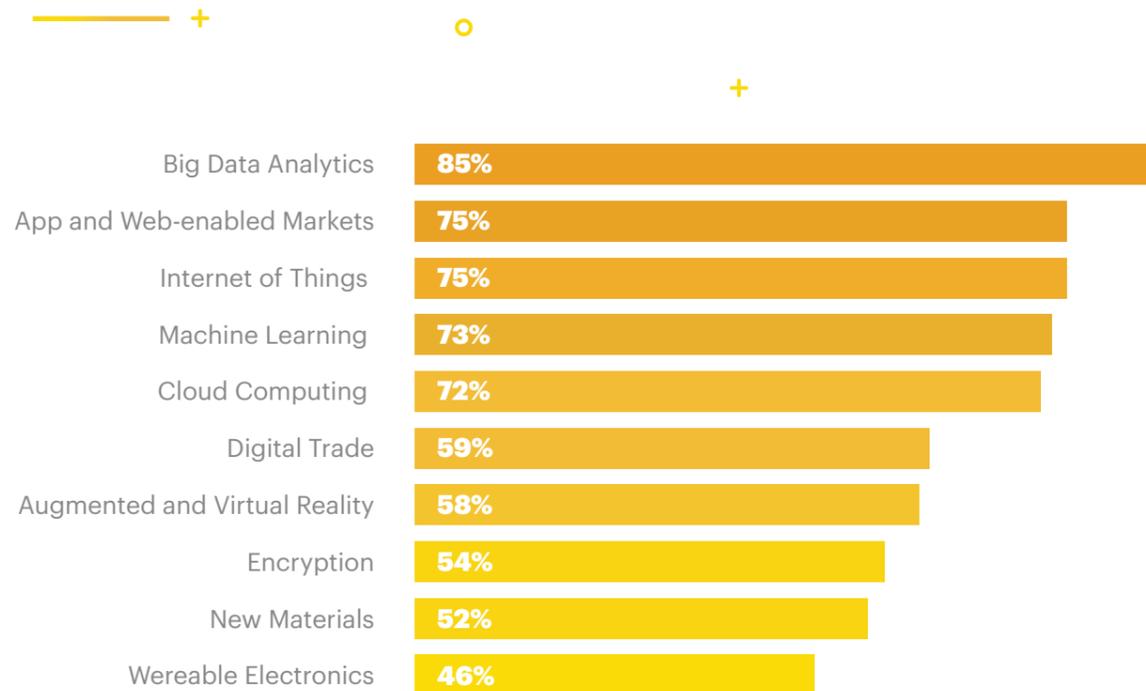
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The 10 most popular technologies for companies by 2022

Technologies according to the proportion of companies that will probably adopt them by 2022 (forecast)



They will be most heavily implemented in tourism, aviation, travel, and the information and communication technologies sector.

The application of currently emerging technologies, such as digital trade, augmented and virtual reality, encryption, blockchain and 3D printing will become more established by 2022.



Aviation, Travel and Tourism



Information and Communications Technologies

2022



1 out of every 10 people will wear internet-connected clothing



1 trillion internet-connected sensors



Production of the first 3D-printed car

Sources: Future of Jobs Survey 2018, World Economic Forum

Sources: Future of Jobs Survey 2018, World Economic Forum
Deep Shift Technology Tipping Points and Societal Impact. World Economic Forum

Professions most in demand in 4 years

The boom in new technologies will increase the demand for professionals such as data and scientific analysis specialists, software and app programmers and specialists in e-commerce and social networks. Specialists in artificial intelligence, Big Data, machine learning, information security analysts, and robotics and blockchain engineers will be most in demand.

The roles requiring 'soft' skills are forecast to increase and be related to customer service, marketing and sales.

The most redundant jobs between 2018 and 2022 will be those affected by technological progress and process automation.

Jobs that might become obsolete in four years from now are those affected by process automation and related to data inputting, accountancy and payrolls, secretarial duties, auditing and checkouts, among others.



Source: Future of Jobs Survey 2018. World Economic Forum

Key skills by 2022

The new technologies and the incorporation of machines into the working environment will change the skills most highly valued among professionals.

Apart from the 'hard' skills -knowledge, digital- new 'soft' skills will be required that differentiate us from machines.

Creativity, critical thought, troubleshooting abilities and emotional intelligence: the 'soft skills' of the future.

Machines will streamline the automation of processes and, therefore, humans will become less significant in reasoning and decision-making tasks, administrative duties, research, and the transfer of information. The demand for manual and physical abilities, financial resource abilities and installation and maintenance techniques will also decrease.

Forecasts indicate that the increase in automation will boost labour productivity by 30% (2022 compared with 2015)

The 'soft' skills most highly valued by 2022



Source: Future of Jobs Survey 2018. World Economic Forum

Digital talent integration mechanisms

Companies must assume leadership in the creation of training programmes for their employees in order to support the transition to future professions.

More than half of the companies indicate that their employees will be trained through in-house departments, one quarter through private training providers and around one fifth through public education institutions.

- Governments will be the key partners in the creation of learning incentives
- The opportunities for collaboration include associations with teachers to reform the curricula in schools and universities, intra and inter-industrial collaboration in the creation of talent channels and alliances with trade unions to improve the mobility of talent between industries

Key collaborators in integrating digital training into companies



Source:
Future of Jobs 2018 World Economic Forum

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Digital talent in Barcelona

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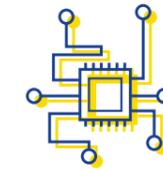
The digital talent gap is growing year after year in Barcelona

In Barcelona, the demand for digital profiles has increased by almost 40% in one year, whereas the profiles available has grown by just 7.6%. **There is a digital talent gap that must be reduced.**



67.720
digital professionals

In 2018, Barcelona recorded 1,282,583 professionals. 5.3% perform digital tasks -involving IT, internet or telecommunications-.



11,4%
digital offers

Of the total number of job offers published in the area of Barcelona, 3,964 are specifically for digital professionals.*



3.964
half the candidates

There are 37 professionals for every job offer published in Barcelona. When this involves offers for digital professionals, this figure drops to 17 available candidates..*



22%
women

In Barcelona, only two out of every 10 digital employees were women in 2018. In Catalonia, female occupation in the sector dropped by 10% from 2016 to 2017.

* This data refers to the September-November 2018 period.



Sources:
TalentUp.io
Barcelona Activa (2018)
ACCIÓ. El Sector TIC a Catalunya. Píndola sectorial

Barcelona has generated a mature business network with great demand for digital professionals...

... and a leading innovation and entrepreneurship ecosystem.



- Strategic digital sector**

The digital sector in Catalonia is constantly growing and its turnover is in excess of €15.9 B (2015). Barcelona is home to 2,800 companies linked to the digital sector, which is almost 19% of all digital companies in Catalonia.

- Scientific facilities, technology centres, ICT clusters and associations**

Ranked 10th in terms of the quality of the research centres, according to the European Digital City Index.
Wide range of organisations promoting research, innovation and technology.
BSC-CNS, Sincrotrón ALBA, EUREAT, ICFO.

- Growing presence of digital innovation hubs**

Nestlé, Zurich, Siemens, Criteo, etc.

- Trade fairs and congresses**

Ranked the 3rd city in the world in terms of international congresses.
Annual headquarters of MWCBarcelona, SmartCity Expo, IoT Solutions World Congress

5th European Startup Hub

Only behind Berlin, London, Stockholm and Dublin. It is home to 1,000 startups and the Spanish city to welcome most (34%), followed by Madrid (31.5%), Valencia (5.5%) and Bilbao (3%).

3th Most attractive City

After Berlin and London, Barcelona is the city preferred by European founders to create new companies.

5th Investment Hub

5th investment hub in Europe to receive most investment, after London, Berlin, Paris and Stockholm.
Barcelona attracts 58% of all Spanish capital invested in startups.

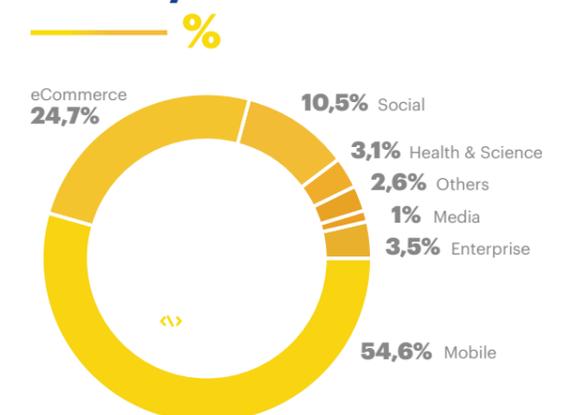
Investment in the mobile and e-commerce sectors

Barcelona will be an international hub for artificial intelligence. Genomics, VR, AR and Blockchain will also mark the city's innovation ecosystem.

IA Benchmark technology in 4 years

Almost 85% of all capital invested in Barcelona focuses on the mobile and e-commerce sectors.

Capital invested by industry in barcelona



Sources:
Atomico
PitchBook Data, Inc.
Digital Startup Ecosystem Overview 2017

Sources:
European Digital City Index

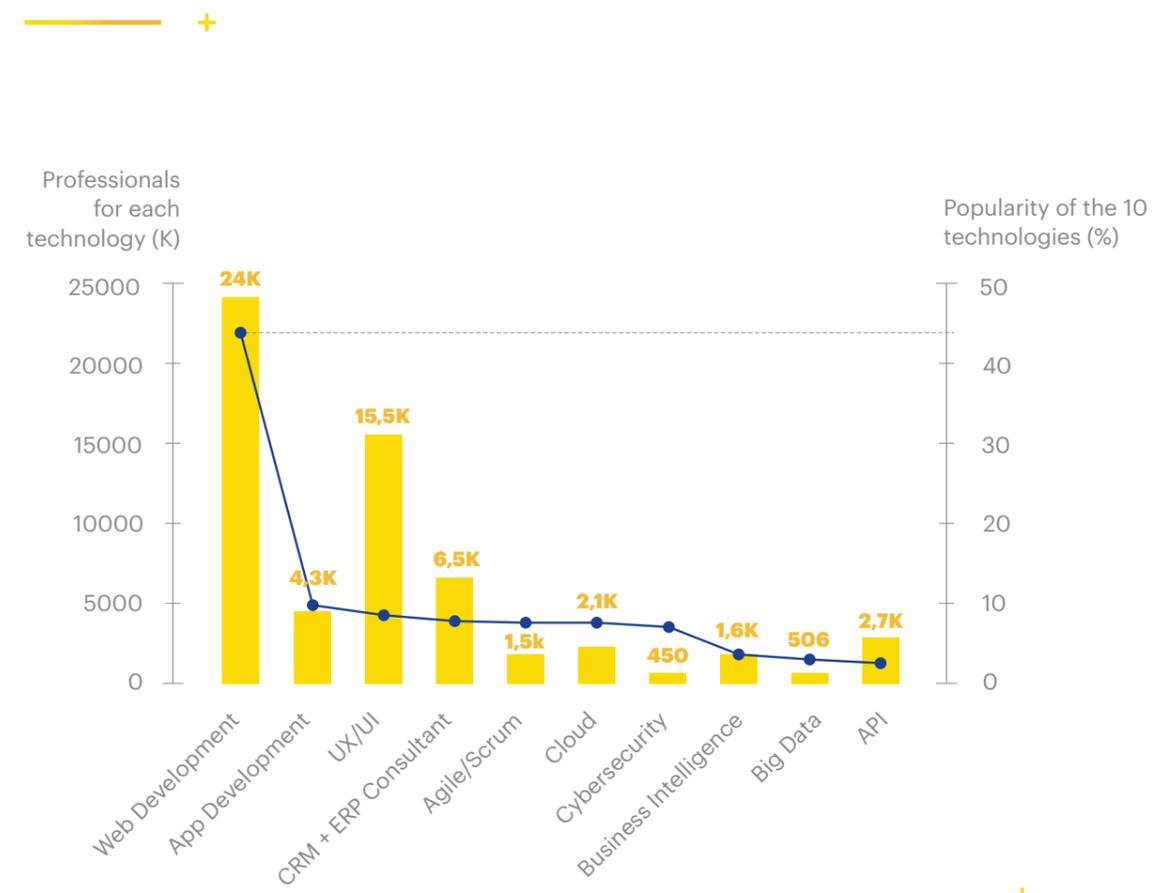
Consolidated technologies in the city

Web development is currently the technology most in demand by companies in Barcelona according to demand for talent.

Popularity of the 10 most consolidated technologies in Barcelona



Professionals by consolidated technology

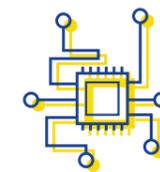


Sources: TalentUp.io

Most popular jobs for consolidated technologies

Companies demand an increasing number of professionals with a command of **Agile and Scrum** as flexible development and management methods for digital projects.

Most popular jobs for consolidated technologies



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Web Development	Frontend developer	Backend developer	Java developer
App Development	iOS developer	Android developer	Mobile developer
UX/UI	UI/UX designer	Product designer	Graphic designer
CRM + ERP Consultant	SAP developer	Dynamics developer	Salesforce developer
Agile / Scrum	Product Owner	Scrum master	Devops engineer
Cloud	Cloud developer	Cloud architect	Cloud engineer
Cybersecurity	Security engineer	IT Security Engineer	Security analyst
Business Intelligence	BI consultant	BI developer	BI analyst
Big Data	Data scientist	Data engineer	Data analyst
API	API's developer	Microservices architect	Mean web developer

Sources:
According to volume of published job offers in TalentUp.io.

Emerging technologies according to the demand for talent

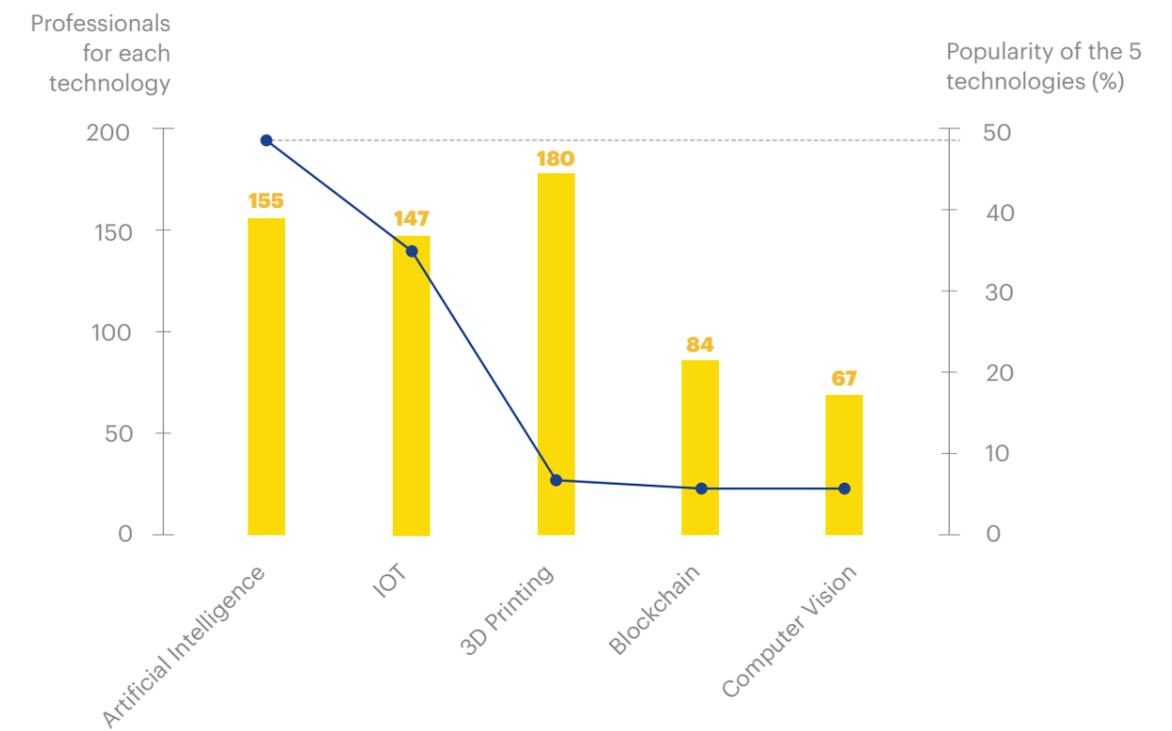
Artificial Intelligence is the emerging technology most in demand in Barcelona, followed closely by **The Internet of Things**.

3D printing, Blockchain and computer vision are taking a firm hold on the market and the first products developed in Barcelona using these technologies are appearing.

Popularity of emerging technologies in Barcelona

- 1** Artificial Intelligence
- 2** IOT
- 3** 3D Printing
- 4** Blockchain
- 5** Computer Vision

Professionals by emerging technology



Sources: TalentUp.io

Most popular jobs for emerging technologies

Most popular jobs for emerging technologies



Artificial Intelligence	AI engineer	AI researcher	AI programmer
IOT	Software developer	IOT developer	Full stack developer
3D printing	3D designer	Software engineer	Manufacturing engineer
Blockchain	Blockchain developer	Full stack Blockchain developer	Hyperledger Blockchain developer
Computer vision	Computer vision engineer	Machine learning engineer	Data Scientist

Sources:
TalentUp.io

Barcelona: pole of attraction for digital talent

30% of all ICT professionals in Barcelona are from other cities. Madrid and London are, respectively, the cities in Spain and Europe to export most talent to Barcelona.

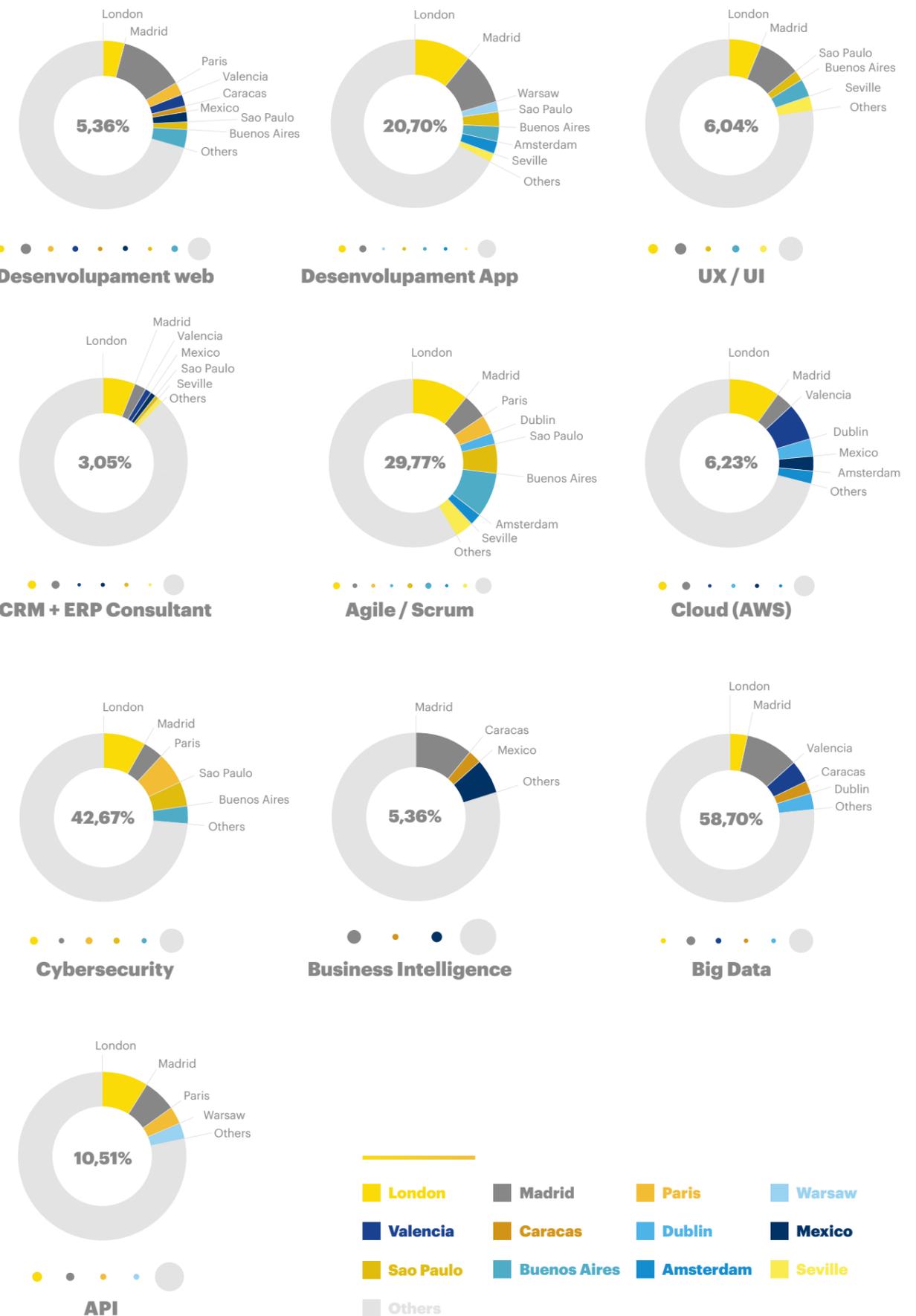
Cybersecurity is the technology to import most talent: almost half of all employees come from outside Barcelona.



Percentage of professionals from outside Barcelona

— %

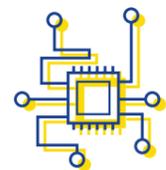
Sources: TalentUp.io



Companies appointing most digital profiles



Consolidated technologies



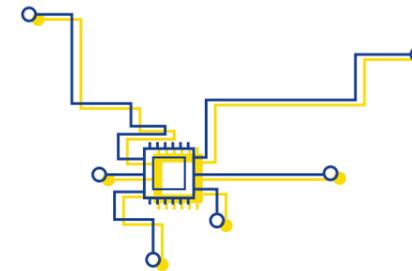
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Web Developer	Everis	Marfeel	Schibsted
App Developer	Opentrends	Slash Mobility	Wallapop
UX / UI	Everis	Edreams	Altran
CRM + ERP Consult	Sage	Seidor	Everis
Agile / Scrum	Everis	Mango	GFT Group
Cloud	Everis	Itnow	Altran
Cybersecurity	EY	Colt	Deloitte
Business Intelligence	Everis	Accenture	Indra
Big Data	Accenture	Everis	Minsait
API	Everis	Edreams	Altran

Emerging Technologies



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Artificial Intelligence	Everis	Accenture	IBM
IOT	Telefónica	IBM	Accenture
3D printing	HP	Xerox	IBM
Blockchain	Everis	GFT Group	Mastercard
Computer vision	Pangea Reality	Crisalix	Inition

Sources:
TalentUp.io



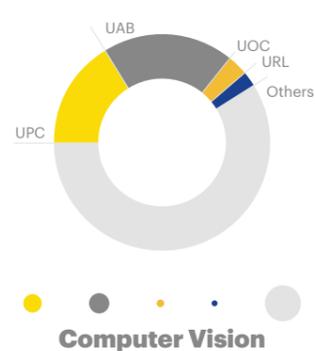
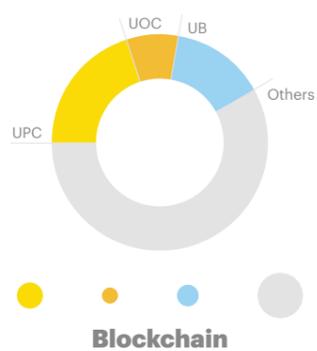
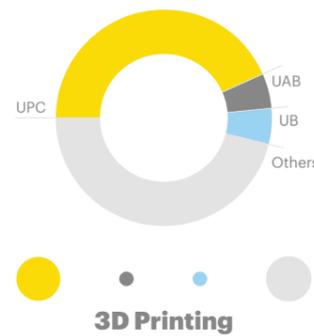
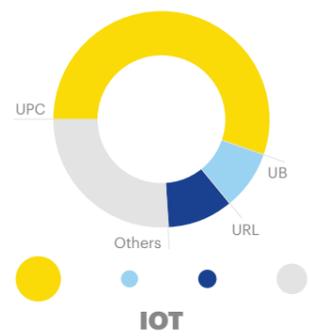
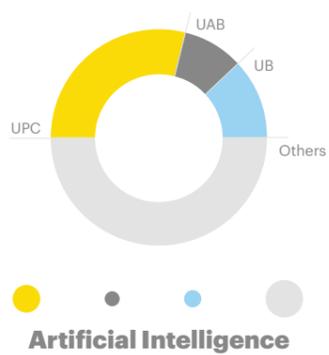
Training in digital skills

The Polytechnic University of Catalonia -UPC- is central to the training of digital talent in Catalonia and has an impact on all jobs and technologies.

The UAB, the UOC, the UB and the UPF also offer training in ICT. The boom of Bootcamps, which have a particular impact on web developer training, is noteworthy.

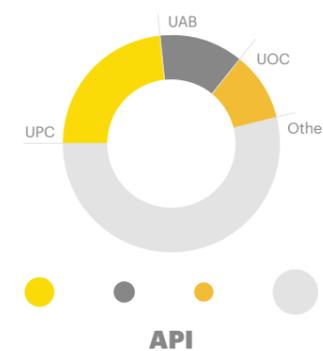
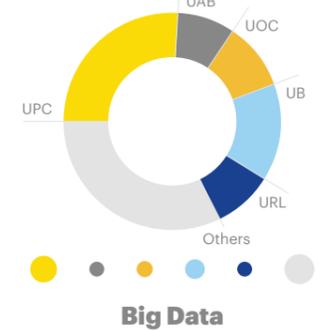
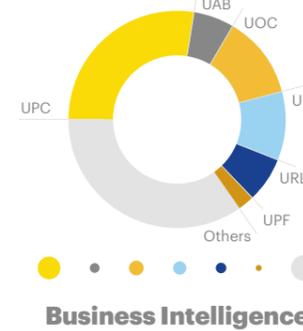
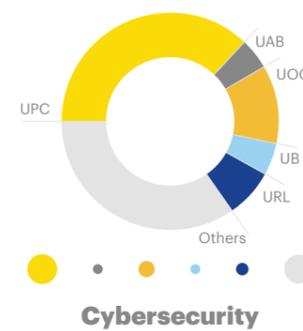
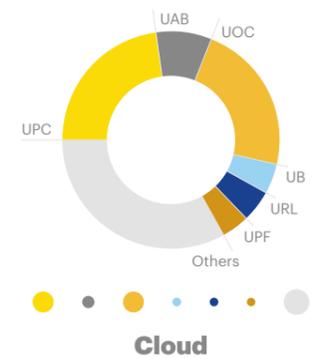
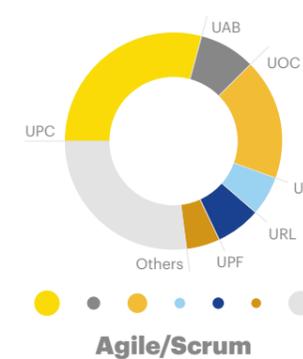
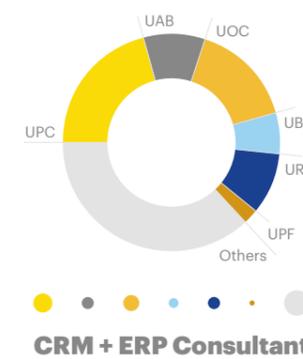
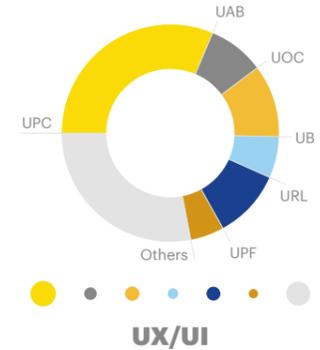
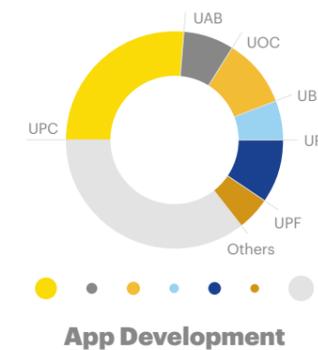
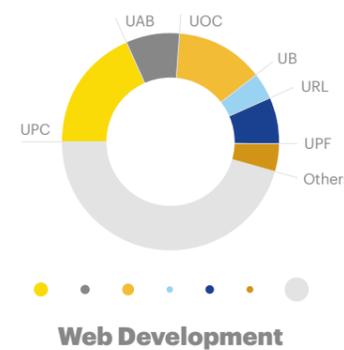
Sources of talent according to job

Emerging Technologies



Sources: TalentUp.io

Consolidated Technologies

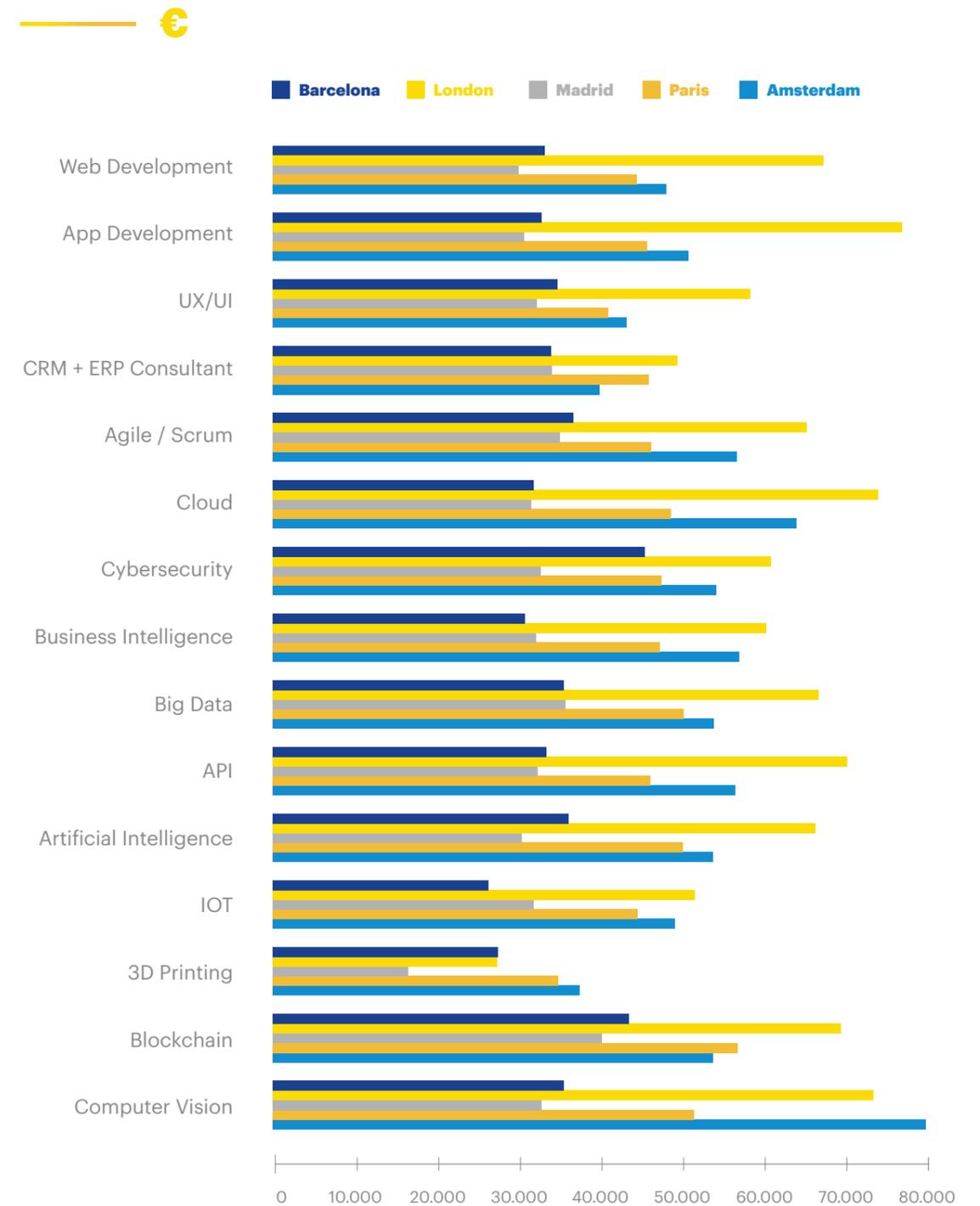


With more competitive digital salaries than other European cities

Barcelona offers higher salaries than Madrid in the digital sector, but notably lower than cities such as London, Paris or Amsterdam.

- The salary of a web developer, the profession currently in most demand in Barcelona, is less than half in this city than it is in London.
- In general, salaries increase as of the third year of experience. Salaries for cybersecurity and CRM +ERP consulting jobs increase exponentially.

Average salary according to job in the main European cities (consolidated and emerging technologies)



Sources:
TalentUp.io

4



Fighting the digital talent gap.

2019-2022 Guidelines



How to reverse the current digital gap? 2019-2022 Guidelines



Promotion of retraining for non-technological talent

Promote campaigns that provide visibility to the opportunities that involve training in digital skills. Accompany professionals throughout the retraining process, from making them aware of the need to acquire digital skills to the training itself.



Attraction of international talent

Promote proactive activities to attract foreign digital professionals, along the same lines as those used to attract international investment. The Tech Visa must be promoted, and the conditions and red paper involved must be streamlined in order to attract extra-Community talent to the city.



Training according to market requirements

Adapt training programmes to the evolution and needs of the market. Permanent interaction between the training institutions and the market is key to training future professionals with the skills required by the market.



Impulse to schools

Promote the interest for technology and digital skills in schools in order to attract youngsters. The vocation of women for digital jobs and professions must also be promoted in order to increase female training and occupation in the sector.



Decision-making based on Big Data

The strategies to promote digital talent must be supported by new technologies such as Big Data. Nowadays, these new technologies allow for the real-time analysis of the evolution of the digital talent market and to anticipate trends.

Barcelona Digital Talent

Barcelona Digital Talent is an alliance formed by the main players of the digital ecosystem in Barcelona to place the city as a pole for digital talent. The initiative seeks to attract and retain local and international digital professionals to respond to the lack of digital talent in the city and the increase in technology-based businesses that require profiles with digital skills.

The founding partners of Barcelona Digital Talent are Mobile World Capital Barcelona, Cercle Tecnològic de Catalunya, Barcelona Tech City, 22@Network, Foment del Treball Nacional, Generalitat de Catalunya and Barcelona City Hall.



