



Talent and tourism

Digital talent in the Travel Tech sector



**Barcelona
Digital Talent**

About the study

This study is spearheaded by the **Directorate General of Tourism** and **ACCIÓ** within the **ICT tourism cluster** initiative in conjunction with **Mobile World Capital Barcelona**, the **Department for Digital Policy of the Government of Catalonia** and the **Cercle Tecnològic de Catalunya** within the **Barcelona Digital Talent** alliance.

The **ICT tourism cluster** emerged with the objective of grouping together companies with hybrid business models between technology and tourism, targeted at either other companies or end consumers, along with stakeholders from the tech and knowledge ecosystem such as universities and tech centres.

The ICT tourism sector is comprised of approximately 371 companies in Catalonia, most of which are SMEs (76%), which employ 9,100 workers and invoice more than 1 billion euros. These companies work in travel technology, consulting, reservation management and connectivity or software to manage establishments, among others.

At a time of technological change and evolution, the goal of the cluster is to be a spur and stimulus for all the companies in the Catalan tourism sector, a sector whose services have experienced increasing digitalisation in recent years. In fact, technologies like big data, artificial intelligence and the Internet of Things are gaining an increasing presence in companies.

The ICT tourism cluster is currently in the process of being created. In the forthcoming months, progress will continue on implementing its action plan in order to assemble a board of directors and hire a cluster manager in 2021.

Barcelona Digital Talent is promoting the competitiveness of the market in order to cope with the current digital talent gap. With the goal of positioning Barcelona as a talent capital, the programme is promoting reskilling in digital competences for professionals and attracting new professionals to the market both domestically and internationally.

For more information, visit barcelonadigitaltalent.com

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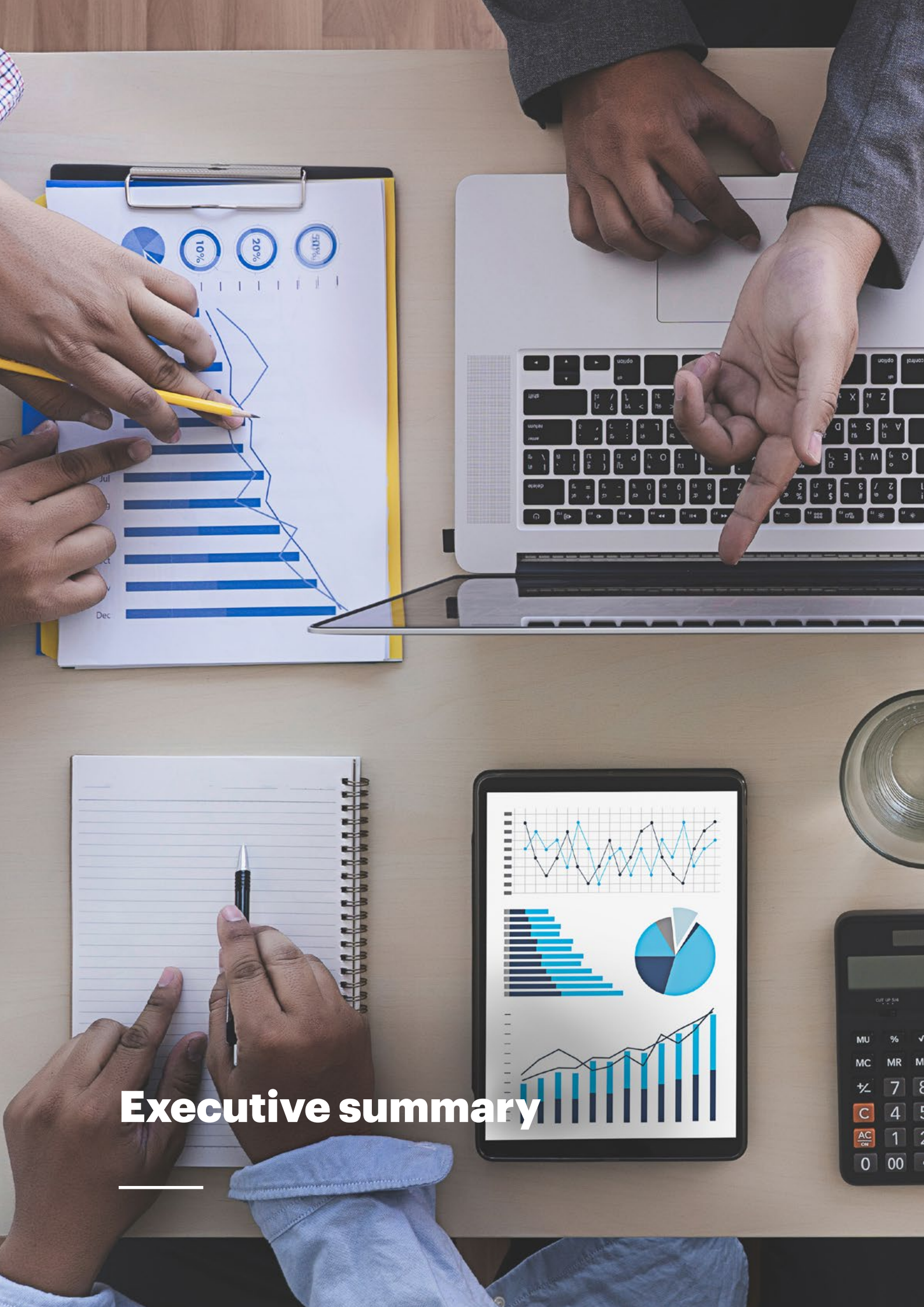


Corporate partners:



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Executive summary

Plenty of digital talent, but just a moderate demand

The ICT tourism sector in Catalonia has more than **5,000 tech professionals** who account for **7%** of the more than 76,000 digital professionals in the Catalan economy. In contrast, the **766** job offers generated in the sector in the past 12 months only account for **1.5%** of the entire demand for digital workers.

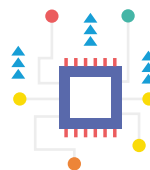
The vast majority of this talent (**89.9%**) works in the **Barcelona area**.



5014

**ICT professionals in
Travel Tech companies**

76325 digital professionals
in Catalonia in all sectors



766

**new job offers in the
in the Travel Tech sector**

51395 new digital job offers
in all sectors

Source: Talent Up

The role of the developer, the most in-demand job in companies

Developers and programmers in different environments and specialisations account for almost **80% of the demand in the sector**. Among them, software system developers and web developers are the least accessible in the market: every job offer has an average of 1.61 and 2.2 potential candidates, respectively.

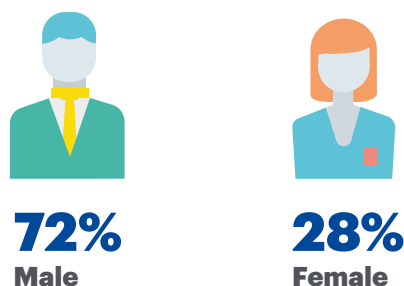
The languages **JavaScript** (and its open-code library **React**) and **Python** stand out in the demand for technologies that need to be mastered and are required in more than **40% of the job offers**.

The diversity challenges in the ICT sector are also found in ICT tourism

Sixty percent of the professionals working in the ICT tourism sector are under the age of 30. The gender gap also exists in this sector, where **28%** of digital professional are female. Nonetheless, this is **2 points over the mean** in the ICT sector, which stands at 26%. The role of Search Marketing Strategist is where women are the most strongly represented, with **47%**.

Distribution of digital professionals in Catalonia in the ICT tourism sector by gender (%)

August 2020



Source: Talent Up

Salaries over the mean in the digital professions

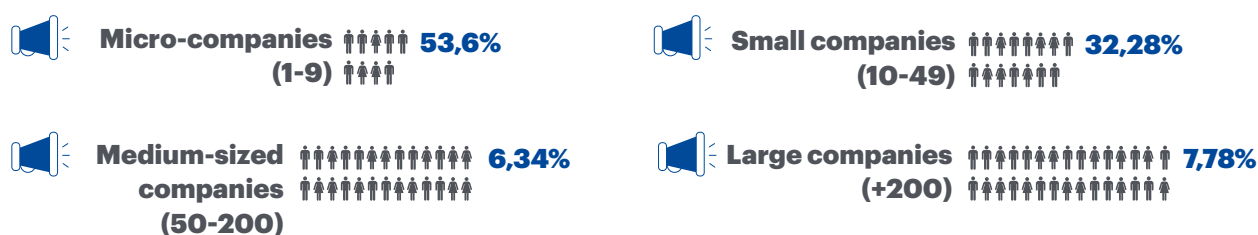
The salaries of **ten of the 12 most popular positions** in the **ICT tourism sector exceed the mean salary** of digital professionals in all sectors as a whole, which is €37,510 gross annually. The position of DevOps Engineer is the best paid, with a mean salary of €52,594. The job of FrontEnd developer earns the least, with €34,466 gross per year.

A diverse ecosystem, with a lower presence of ICT talent in traditional operators

More than **50%** of the digital professionals in the sector work in companies that develop their own technology for the tourism sector. Almost **40%** do so in tech consultancies which offer services to companies in the field of tourism, while the rest work with **tourism operators** that use technology to reach their clients, such as hotel groups and OTAs.

In terms of size, **88%** of the companies in the sector **employ 50 or fewer workers**, and they also generate **88%** of the job demand.

Company size according to number of workers



Source: Talent Up

Covid-19 is slowing hiring, but in the same proportion as in the other sectors

In the months prior to the health crisis (October '19 to February '20), a monthly average of **91** job offers was published, while during the subsequent months (March '20 to September '20) this figure dropped to **41 job offers**. This **55% drop** in the pace of hiring is very similar to the decrease experienced in the demand for digital professionals in all sectors as a whole.

The demand for digital talent in the Travel Tech sector

ICT tourism has more than 5,000 active professionals with digital development competences working in Catalonia.

This sector accounts for 7% of the digital professionals in Catalonia but only 1.5% of the job offers.

Barcelona stands as the capital of digital talent as the home to almost 90% of the companies in the sector.

Number of digital professionals in the tourism sector vs job offers in this sector

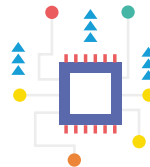
October 2019 - September 2020



5014

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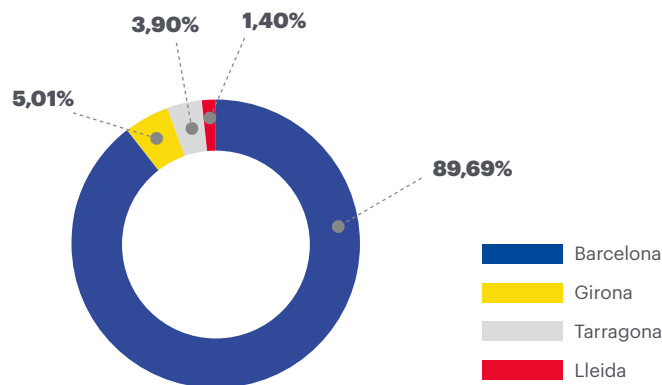
**new job offers in the
in the Travel Tech sector**

51395 new digital job offers
in all sectors

Source: Talent Up

Geographic distribution of digital talent working in the ICT tourism sector in Catalonia

October 2019 - September 2020



Source: Talent Up

« »

“The difficulty we in Travel Tech companies face when looking for talent is a lack of candidates compared to the job offers on the market today. There is a lack of talent with technological training in Catalonia and these job fields should be pushed. There are many startups and companies that would be thrilled to be able to retain them. It's difficult to find the right profile when a professional from the IT team leaves because the competition among companies is extremely fierce and we often don't have enough resources to keep all the professional on staff for long periods of time.

On the other hand, starting a project from scratch is extremely appealing to IT professionals. This is a point in favour that helps us attract talent and offer a very ambitious value proposition beyond the salary. Startups provide people with the opportunity to have a multidisciplinary job closer to business and the product, which is very attractive. After all, because these are new projects, the technologies tend to be more innovative and the professionals have more freedom to decide on their work tools and the pace of the project to be developed.

Still, we at startups help workers grow and build a much more comprehensive job profile than a large company does, where the tasks are more limited. After working at a startup, IT professionals go on the job market with the competences they have acquired, which make them more appealing professionals to other companies.”

Christian Rodriguez and Guillermo Gaspart

Founders & CEOs of BYHOURS

The profiles of digital professionals in Catalonia

More than 50% of the digital professionals in the Travel Tech sector work as software developers.

On the other hand, the tension between supply and demand in the market is magnified in roles like Software Developer, Web Developer and Search Marketing Strategist, which have a ratio of one or two potential candidates for every job offer published.

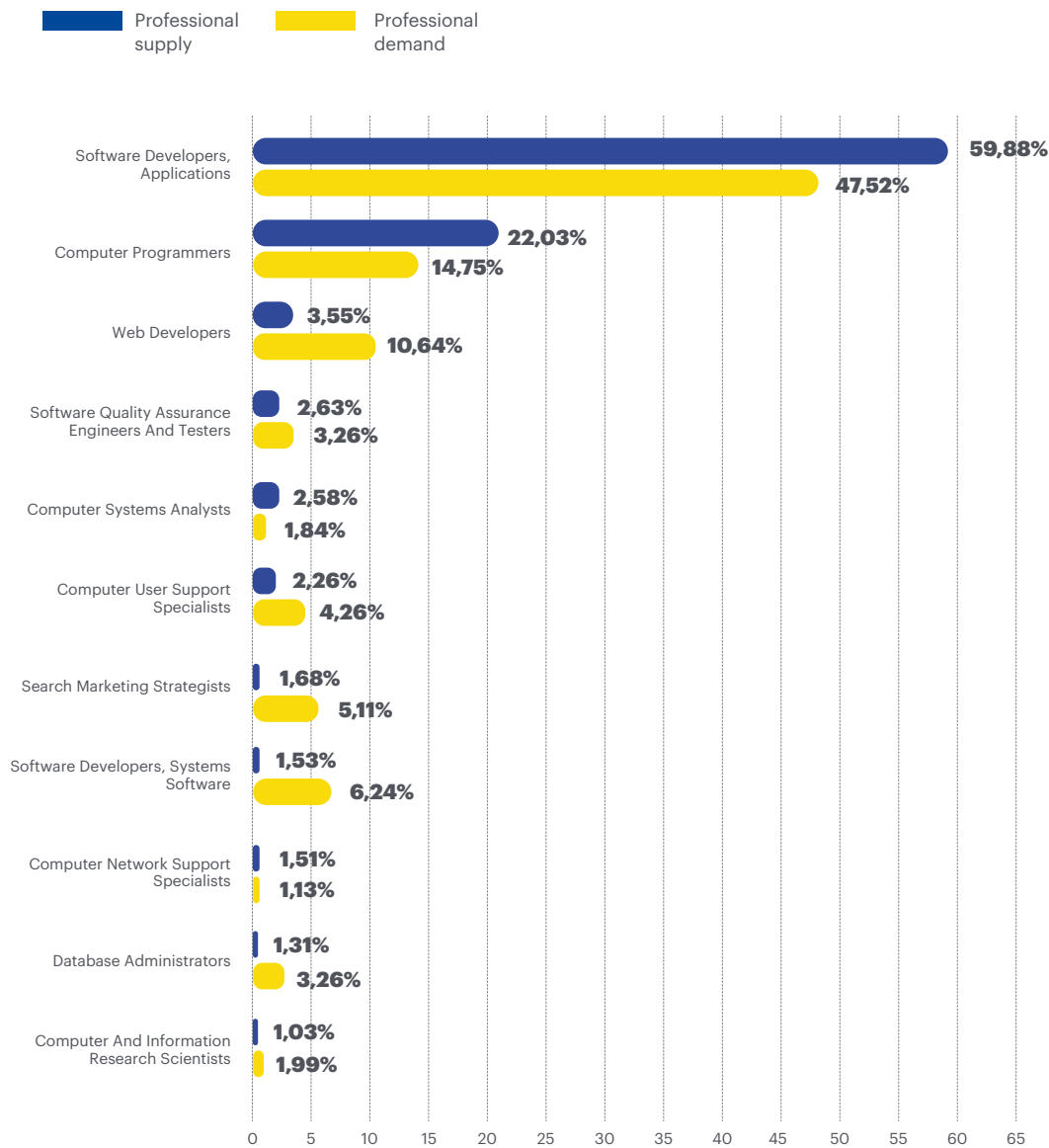
Supply and demand of professionals in the Travel Tech sector segmented by role*

October 2019 - September 2020

Roles	Professional supply (Abs)	Professional supply (%)	Professional demand (Abs)	Professional demand (%)	Ratio
Software Developers, Applications	2780	59,88%	335	47,52%	8,30
Computer Programmers	1023	22,03%	104	14,75%	9,84
Web Developers	165	3,55%	75	10,64%	2,20
Software Quality Assurance Engineers And Testers	122	2,63%	23	3,26%	5,30
Computer Systems Analysts	120	2,58%	13	1,84%	9,23
Computer User Support Specialists	105	2,26%	30	4,26%	3,50
Search Marketing Strategists	78	1,68%	36	5,11%	2,17
Software Developers, Systems Software	71	1,53%	44	6,24%	1,61
Computer Network Support Specialists	70	1,51%	8	1,13%	8,75
Database Administrators	61	1,31%	23	3,26%	2,65
Computer And Information Research Scientists	48	1,03%	14	1,99%	3,43

Ratio: How many people and offers there are per job

* Descriptions of the roles mentioned in this graphic are included in the annexe.



Source: Talent Up

The most in-demand positions in the Travel Tech sector are Frontend Developer and Backend Developer, with 19.59% and 22.04% of all the digital job offers published in this sector in the past 12 months.

Frontend Developer and Fullstack and Java Developer are the most popular positions among the digital professionals in the tourism sector.

Supply and demand of professionals in the Travel Tech sector segmented by position

October 2019 - September 2020

Roles	Professional supply (Abs)	Professional supply (%)	Professional demand (Abs)	Professional demand (%)	Ratio
Frontend Developer	198	24,50%	48	19,59%	4,13
Full Stack Developer	131	16,21%	12	4,90%	10,92
Java Developer	105	13,00%	17	6,94%	6,18
User Experience Designer	58	7,18%	21	8,57%	2,76
Devops Engineer	57	7,05%	29	11,84%	1,97
Backend Developer	55	6,81%	54	22,04%	1,02
Quality Assurance Engineer	53	6,56%	3	1,22%	17,67
Ios Developer	41	5,07%	15	6,12%	2,73
Android Developer	38	4,70%	9	3,67%	4,22
Data Scientist	34	4,21%	13	5,31%	2,62
Php Developer	30	3,71%	8	3,27%	3,75
Data Engineer	8	0,99%	16	6,53%	0,50

Ratio: How many people and offers there are per job

Source: Talent Up



“The tech sector is undergoing changes at a speed never seen before, and this means that professionals capable of assimilating and introducing these changes in development and production environments are more highly valued than those that have specific in-depth knowledge in a given area or technology.

The simplification of certain tools and procedures to create applications and solutions in general mean that more attention is being given to users who were not originally trained in tech but are experts in some functional area (tourism, in the case at hand) and whose training is expanded with tech knowledge so that they can enter the digital job market.

Today nobody questions cloud computing, and the owners of these platforms are increasingly expanding the services deployed by making them easy to use and administer and fulfilling the regulations in force.

This directly affects the demand for professionals. It is more and more common to search for technicians with certifications in Amazon Web Services or Microsoft Azure, at the same time that the demand for Database Managers or Systems Administrators is declining.”

Félix Navarro

CEO Prestige Software



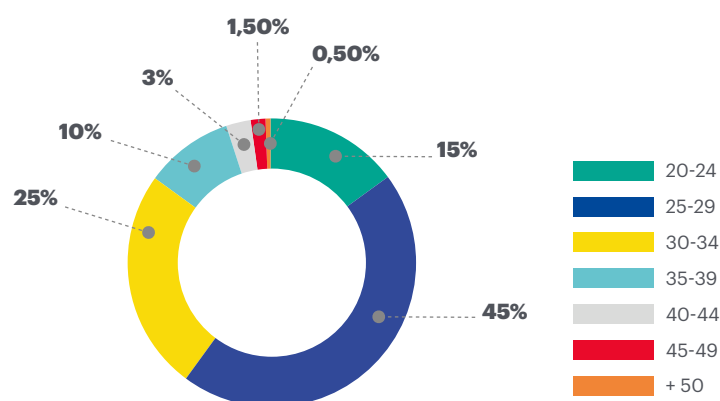
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Women have the strongest presence in the role of Search Marketing Strategist, with 47%.

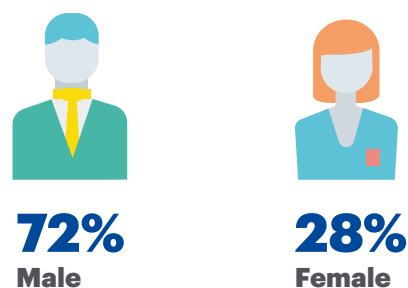
Distribution of digital professionals in Catalonia in the ICT tourism sector by age (%)

August 2020



Distribution of digital professionals in Catalonia in the ICT tourism sector by gender (%)

August 2020



Source: Talent Up

Number of digital professionals in Catalonia by role and age (%)

August 2020

Roles	Male	Female	Age (mean)
Software developers, applications	74%	26%	29
Computer programmers	75%	25%	27
Computer network support specialists	73%	27%	35
Web developers	63%	37%	29
Computer systems analysts	62%	38%	29
Computer user support specialists	70%	30%	32
Search marketing strategists	53%	47%	29
Software quality assurance engineers	66%	34%	30
Network and computer systems administrators	79%	21%	30
Computer and information research scientists	71%	29%	34
Software developers, systems software	78%	22%	29
Database administrators	79%	21%	26

Source: Talent Up



	MON	TUE	WED	THU	FRI
8 AM	W.R.		W.R.		W.R.
9 AM		MEETING			
10 AM		TRAINING		TRAINING	
11 AM			YES		
12 PM	TRAINING			(LUNCH)	
1 PM					SMITH'S
2 PM				PROJECT	
3 PM			GRADING	DELIVERY	

Types of companies that recruit digital talent

The ICT tourism sector is represented by companies that develop in-house technology for the tourism sector, ICT consultants who work in this sector and companies offering tourist services which use technology to reach their clients, such as hotel groups and OTAs. Most digital professionals, more than 50% of them, work in companies that develop in-house technology for the tourism sector.

In second place, 40% of the digital talent works for companies that offer consultancy services in this sector, and thirdly comes the tourism category.

Even though tourism accounts for 43.92% of Travel Tech companies, they only hire 9.49% of digital professionals

Types of companies that hire the most digital professionals in the ICT tourism sector

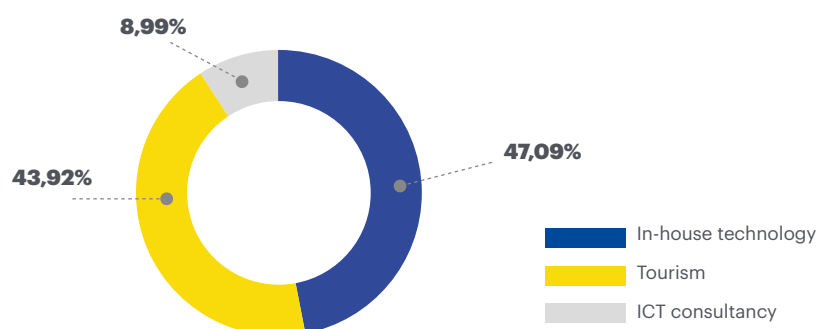
October 2019 - September 2020

Roles	Professional supply (Abs)	Professional supply (%)	Professional demand (Abs)	Professional demand (%)	Ratio
In-house technology *	2574	51,33%	508	66,15%	5,07
ICT consultancy **	1965	39,18%	134	17,45%	14,66
Tourism ***	476	9,49%	126	16,41%	3,78

Source: Talent Up

Types of companies in the ICT tourism sector in Catalonia (%)

October 2019 - September 2020



Source: Departament d'Empresa i Coneixement de la Generalitat de Catalunya



“Digital technology is radically changing the bases of tourist businesses, generating opportunities to create new businesses while also exerting a great deal of pressure on current companies, which are being forced to adapt and innovative quickly and flexibly.

The new emerging technologies, such as bots, AI-driven applications, blockchain, those facilitated by big data, the Internet of Things (IoT) and augmented reality devices, among others, are driving the digital transformation that the sector has to cope with, which is posing a major challenge to all the stakeholders participating in their development. But more importantly, these digital technologies can also be used to promote innovation and transform any tourism business.

Innovation and technology are a binomial which all companies seek to use as key levers to help business organisations solve their competitiveness, productivity and sustainability problems. However, innovation is associated with technological development and hiring and retaining talent in the tourism company.

Therefore, the best guarantee of launching innovation processes within organisations is having both the right knowledge on how the advanced technologies that the company needs work and a professional team specialised in the areas comprising the organisation with in-depth knowledge of clients’ needs.

Innovation and technology are the binomial needed for the development of the tourism sector, along with training and retaining talent in the human teams of organisations in the sector.”

Dr. José Antonio Pérez-Aranda

Director of EU CETT-UB

Companies with more than 50 workers account for 88% of the digital talent market in Catalonia.

In the ICT tourism sector, 7.78% of the ecosystem is comprised of large companies. Still, this type of company absorbs more than 50% of the digital professionals in the market.

Number of digital workers by company size

October 2019 - September 2020

Company size	Digital professionals (%)	Demand for professionals (%)	Ratio
Micro-companies (1-9)	1,12%	0,39%	15,00
Small companies (10-49)	11,09%	11,67%	4,93
Medium-sized companies (50-200)	35,72%	41,83%	4,43
Large companies (+200)	52,06%	46,11%	5,86

Company size according to number of workers

 **Micro-companies**  **53,6%**
(1-9) 

 **Small companies**  **32,28%**
(10-49) 

 **Medium-sized companies**  **6,34%**
(50-200) 

 **Large companies**  **7,78%**
(+200) 

Source: Talent Up



“Since the large online travel agencies (OTAs) appeared, the travel sector has been immersed in constant reinvention, which has changed the way of selling forever. This sudden change has forced its business models to evolve and led to the search for talent capable of adapting to the digital age.

Given increasingly demanding clients, whose high expectations generated by the social media we have to meet, the major challenge right now is to fit together all the pieces to personalise the service to the greatest extent possible.

Therefore, we have to continue offering the experience of consolidated professionals from the more traditional sector and make it fit in with the new digital professionals who bring disruptive ideas to revolutionise the way we will travel in the future. The people who are being educated today are the ones who will bring about this new digital evolution first driven by OTAs.

In an environment in which the competition among tourist destinations is increasingly fierce, innovation hubs are emerging to create large tech communities that help attract, train and retain the best talent available by creating startups, as well as develop major citywide projects which position us as tech benchmarks globally. The quest for the big unicorns of Travel Tech has just started, and who knows whether the large companies that dominate the world will be in this field in a few years.”

Manel Casals

General Manager of Hotel Association

The impact of Covid-19 on the digital talent market in the Travel Tech sector

Covid-19 has accelerated the decline in new digital talent hires in the ICT tourism sector. Since December 2019, job offers have been posted at a low rate. The month with the steepest decline was July 2020.

Still, there is no evidence that this drop is worse than in other sectors.

Impact of Covid-19 on the demand for digital talent in all sectors and in the Travel Tech sector

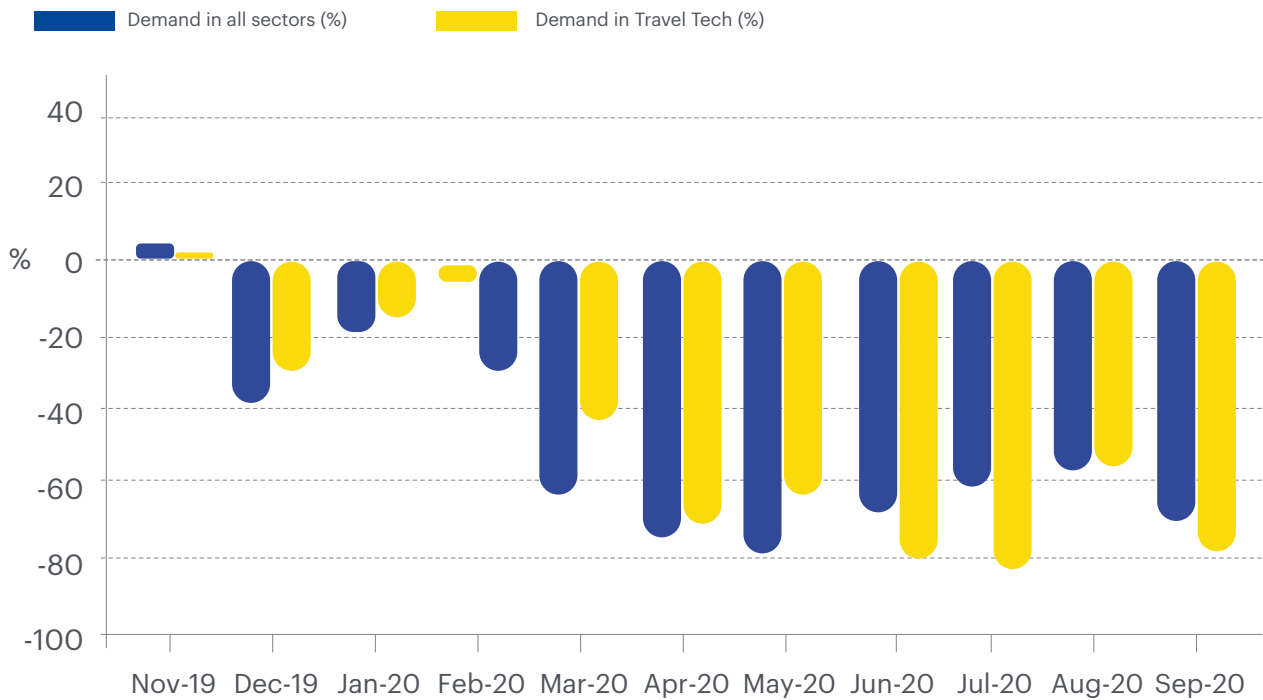
October 2019 - September 2020

Month	Demand in all sectors (%)	Demand in all sectors (Abs)	Demand in Travel Tech (%)	Demand in Travel Tech (Abs)
Oct-19 (baseline month)	0	7228	0	110
Nov-19	5,76	7644	2,73	113
Dec-19	-35,76	4643	-27,27	80
Jan-20	-16,46	6038	-13,64	95
Feb-20	-5,48	6832	-26,36	81
Mar-20	-58,88	2972	-39,09	67
Apr-20	-70,03	2166	-66,36	37
May-20	-74,14	1869	-59,09	45
Jun-20	-63,63	2629	-75,45	27
Jul-20	-57,03	3106	-77,27	25
Aug-20	-52,88	3406	-51,82	53
Sep-20	-65,84	2469	-72,73	30

Source: Talent Up

Impact of Covid-19 on the demand for digital talent in all sectors and in the Travel Tech sector

October 2019 - September 2020



Source: Talent Up

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“It was 2006 when the term Travel Tech started to be used the way we mean it today, when companies began to emerge that focused on instigating substantial changes in the way digital technologies contribute to shaping the retail tourism and travel sector.

But it was within the context of the digital transformation that the existence of a new type of technology and digital business models became clear, simultaneously revealing a new type of talent within organisations, which viewed technology as something more than a mere management tool and placed it at the service of people both inside and outside companies.

And suddenly, the black swan appears, and the pandemic in which we are immersed made what was desirable into a necessity, such that beyond having sound business models or a controlled, optimised investment in digital market, the Travel Tech model became a true sensor of the market which makes it possible to convey to business departments what, how, when and how much our clients want to spend on their trips and holidays. And this is where the game is. Companies that have the right talent, from programmers to heads of business, who act based on relevant data and efficient technologies, will have the best chances of making it and coming out even stronger. As for the others, I can only wish them luck!”

Josep Maria Bagudà Serenó

Managing Director Bedbank - Avoris Travel

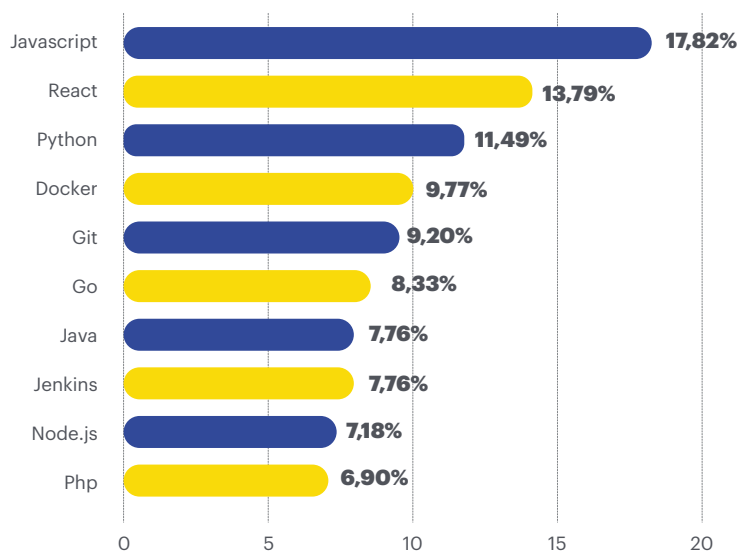
Companies' use of the most popular technologies

The most popular technologies among companies geared at tourism are first JavaScript, followed by React and Python.

Other technologies like Docker, Git and Go are also present, but to a lesser extent.

Global trends. Programming technologies

October 2019 - September 2020



Source: Talent Up



"At Vueling Tech, we have many different tech professionals, all of whom are essential for the company's digital transformation and its progression towards becoming a data-driven airline.

The key IT jobs at Vueling are first the Senior Frontend and Backend Developers; the former lead the graphic interface (in HTML5) to assure the usability of the technology, while the latter lead the digital logic and connection with the databases on the servers (C#, APIs, .Net, SQL Server).

The data-driven transformation is carried out with Data Engineers and Data Analysts/ Scientists; the former use Cloud Computing and Big Data methodologies to design and merge databases through which they conduct analyses and identify opportunities for improving the business with Artificial Intelligence and Machine Learning models. These four profiles work in Agile methodologies and rely on more technical profiles and systems managers like Cloud Operations and DataOps Engineers.

They design and manage the information architecture so that it is available, thus promoting the adoption of cloud computing (in AWS and Azure). At Vueling Tech, we motivate our talent working on problems that have a direct impact on an airline's multiple business lines (e-commerce, operations, finances, pricing, customer service)."

Javier Álvarez

IT Director at Vueling

Rita Barata Silva

Data Analytics Director at Vueling


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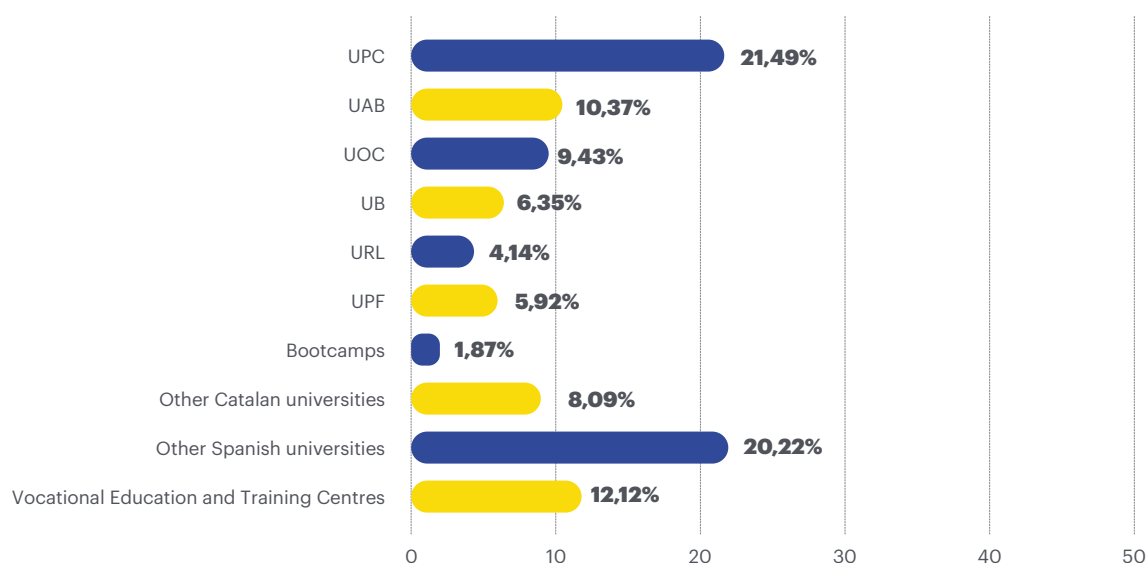
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Training digital talent in digital competences

The UPC is the leading school training digital professionals in the field of ICT tourism.

Professionals by school

October 2019 - September 2020



Source: Talent Up



“The evolution of the tourist and hospitality industry in recent years and the prospects of digital transformation in the short and middle term reveal the need to conduct an in-depth reflection on the training needs of students, considering the future competences which will be needed directly in the tourism sector as well as other related sectors which share many synergies.

Technologies like artificial intelligence, big data, blockchain, business intelligence, service robotics, the Internet of Things, 5G and 3-D printing are spearheading a fourth Industrial Revolution which is just getting started, and we have to be prepared for it, as it is often becoming more difficult to distinguish between what sounds like science fiction and what might be a reality that is closer than we imagine.

Training the new generations of professionals and leaders of the tourism sector requires the range of competences developed in university programme to be expanded so that students become augmented professionals, that is, professionals equipped with the knowledge, skills and attitudes which, coupled with specific training in tourism, will give them the capacity to deal with the key business tasks, address complex challenges and most importantly be capable of adapting to the constant changes around us. In this context, the addition of competences related to understanding and applying the new technologies and managing projects with agile, high-performance methodologies are the main allies in making the most of the opportunities afforded by the new technologies to promote business models aligned with the sustainable development goals.”

Albert Fornells

Vice-Dean of the Sant Ignacio Faculty of Tourism and Hotel Management at HTSI - Universitat Ramon Llull

Salaries of digital professionals in the Travel Tech sector

The mean salary of digital professionals in the entire ICT sector is €37,510. Ten of the most popular positions in the ICT tourism sector earn higher than this mean.

DevOps Engineer is the profession with the highest mean salary of all, with €52,594.44 gross per year.

Mean gross annual salary according to position in the ICT tourism sector

October 2019 - September 2020

Position	Mean salary ICT tourism sector
Android	38.190,00
Backend	42.880,28
Data engineer	38.900,00
Data scientist	46.814,81
Devops engineer	52.594,44
Front end	34.466,35
Full Stack Developer	38.293,50
iOS Developer	39.660,00
Java developer	45.268,57
PHP developer	36.850,00
Quality Assurance engineer	41.208,33
User experience designer	43.234,55

Source: Talent Up



“Barcelona is the digital talent capital and an indisputable pole of tourist attraction, but for a tech company in the tourist field located in Barcelona, this apparently unbeatable combination poses major challenges in attracting and especially retaining talent.

The main challenge in attracting tech talent to Barcelona is the stiff competition not only in the number but also in the quality of jobs offered, as the city’s positioning as one of the leading ecosystems for startups internationally has raised the innovation bar very high in both technologies and working dynamics and management of human teams, and of course in tech salaries as well. In this context, many companies are choosing to stand out with their professional benefits.

And this point is where Voxel Group has clearly focused on values as a differential feature, beyond the more traditional benefits associated with emotional, mental, physical and social wellbeing. Indeed, our experience has shown us that based on constant innovation in technology and organisation, teams that coalesce around a shared purpose and way of doing things can become a pole attracting new talent and are unquestionably a huge anchor for workers today.”

Joan Manel Alvarez

Chief People Officer at VOXEL



Analysis of digital talent in the ICT tourism sector

The travel sector is already experiencing a digital revolution which is only predicted to heighten once the tourism sector reopens after the pandemic. If anything has become clear in this situation, it is the **need to make headway in the digitalisation processes** in both the productive sectors and the media and social relations. We could say that one of the scenarios in the post-Covid-19 era will be the reality of the digital economy. However, we should also stress that the degree of digitalisation in Catalonia is uneven and imbalanced both technically and logistically and in terms of training. This is why digitalisation is a future challenge for the economy in general and, in the case at hand, for the tourism sector in particular.

With the acceleration in digitalisation, the tech demand – to increase the speed, flexibility, confidence, security and value proposition of the tourism sector – will only increase.

The response to this demand entails **having talent specialised in technology** as well as personnel capable of adapting and expanding their digital knowledge, not only in their initial training but also throughout their entire professional careers.

On the other hand, we should not lose sight of the fact that **Catalonia is a tourism benchmark** not only as a destination and sector but also in training professionals. Mid- and upper-level vocational training and research in the Catalan tourism sector are international touchstones. This offers us a huge **opportunity to have talent with strong knowledge of the sector** who can be highly beneficial within the Travel Tech sector if they have the right digital and technological knowledge.

The challenge facing companies in the ICT tourism sector is not only hiring tech experts but also retaining them and constantly training their talent to adapt it to the constant changes and advent of new technologies.

It is important to add that while until now talent was often geographically restricted, **remote work has become widespread and is now a common way of performing professional tasks**, especially in tech companies. This opens up a window of opportunity for Travel Tech companies to have specialised remote talent, either inside or outside Catalonia.

In order to establish a **digital talent attraction and retention strategy**, it is important to identify at the granular level the tech skills needed for the company to build value, develop a clear vision of the present and future talent needs and focus on finding specialised talent, such as adaptable learners. A company can try to tackle this strategy individually, but it is even more beneficial to purpose cooperation via public-private collaboration projects to step up the different actors' coordination, collaboration and communication with the goal of working on the recruitment, capitalisation and talent of professionals in the sector.

This joint sectoral work via the ICT tourism cluster, aligned with the work trends in clusters internationally, can offer the opportunity to expand visions and organise a joint training proposal which could meet the main challenges below:

1 To encourage tech vocations among the professionals in the tourism sector



- Designing and creating a series of training programmes to guide professionals in the sector towards digital business profiles with the goal of covering jobs where there is a lack of hybrid knowledge (business + technology).
- Teaching universities and training centres in the tourism field about the Travel Tech ecosystem in Catalonia so they can understand the sector's needs and gradually introduce the ICT tourism side in training programmes, bearing in mind that some of this has already been done by some tourism schools.

2 To foster lifelong training of the talent in companies in the sector



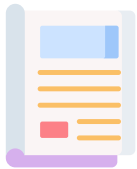
- Establishing a training system that fosters the reskilling of professionals at all levels: from digitalising managerial profiles to introducing emerging new technologies or training in the tourism sector for the more technical profiles.
- Training human resources teams in companies so they understand the tech profiles needed and establishing advanced personnel management systems, in line with the international demands and trends, with the goal of not only offering attractive salaries but also making the Travel Tech sector in Catalonia an ecosystem where digital talent wants to work.

3 To promote female digital talent within the ICT tourism sector



- Even though female talent is in the majority in the tourism sector, this trend is inverted in the Travel Tech sector. We should particularly encourage women's vocation and reorientation towards digital tasks with the goal of increasing female employment in the sector.
- Hiring more women in the sector will positively contribute to lowering the gender salary gap, given that salaries in the Travel Tech sector are higher than the mean. This will also promote companies' competitiveness because of the positive effects of diversity on productivity, and it could become one of the main levers to close the gap between the talent supply and demand in our ecosystem.

4 To understand the evolution of present and future technologies in the sector



- With the goal of creating a training platform that meets the sector's present and future needs, information is needed on the technologies used the most and which ones are leading to disruption in the sector.
- Despite the fact that the most famous benchmark reports discuss global tech trends, it is essential to work with an eye on the future and constantly analyse the specific tech talent in the ICT tourism sector with the goal of anticipating training to meet market needs. For this reason, a report like this one should be issued periodically to analyse the results of the evolution in the tech demand and draw conclusions related to training and education.

5 To attract talent from other geographic regions



- Even though the Travel Tech ecosystem in Catalonia is concentrated on the Barcelona metropolitan area, the tech sector's focus on remote work, especially during the pandemic, affords the possibility of having tech talent, especially the purest talent, who were trained at other universities in Catalonia or elsewhere but do not want to move to Barcelona.



Annexes

Description of the roles mentioned on page 11 of the study

Software Developers, Applications

They develop, create and modify general or specialised computer applications. They analyse users' needs and develop software solutions. They design or personalise software for clients' use with the goal of optimising operational efficiency. They may analyse and design databases within an area of applications, either working individually or coordinating the development of databases as part of a team. They may supervise computer programmers.

Computer Programmers

They create, modify and provide the code, formulas and script that allow computer applications to be executed. They work from specifications developed by software developers or others. They may help software developers analyse users' needs and design software solutions. They may develop and write computer programmes to store, locate and retrieve specific documents, data and information.

Computer Network Support Specialists

They analyse, test, troubleshoot and evaluate existing network systems, such as a local area network (LAN), a wide area network (WAN) and Internet systems or a segment of a network system. They maintain the network to ensure that they work properly with minimum interruptions.

Web Developers

They design, create and modify websites. They analyse users' needs to implement the website's content, graphics, performance and capacity. They may integrate websites with other computer applications. They may turn written, graphic, audio and video components into web-compatible formats using software designed to help create web and multimedia content.

Computer Systems Analysts

They analyse science, engineering and business problems and other data processes to implement and improve computer systems. They analyse users' requirements, procedures and problems to automate or improve existing systems and check the capacities of the computer system, the workflow and the programming limitations. They can analyse or recommend specific commercially available programmes.

Computer User Support Specialists

They provide technical assistance to computer users. They answer questions or solve computer problems for clients in person, by telephone or electronically. They may provide assistance on how to use computer hardware and software, including printing, installation, text processing, email and operating systems.

Search Marketing Strategists

They use marketing tactics to boost the visibility and interaction with the content, products or services on devices or interfaces that can operate on the Internet. They examine the behaviour of queries in general or specialised search engines or other Internet-based content. They analyse research, data or technology in order to understand users' intentions and measure the results to ensure continuous optimisation.

Software Quality Assurance Engineers And Testers

They develop and execute software testing plans to identify problems and their causes.

**Network And
Computer Systems
Administrators**

They install, configure and maintain a local area network (LAN), a wide area network (WAN) or a segment of an organisation's network system. They supervise to guarantee the availability of the network for all system users and may undertake the maintenance needed to support the availability of the network. They may control and check website performance to guarantee that websites work properly and without interruptions. They can help model, analyse, plan and coordinate the network between the network and data communications hardware and software. They may supervise specialists in assisting computer users and computer networks. They may administer network security measures.

**Computer And
Information
Research Scientists**

They research computers and fundamental information sciences as theoreticians, designers or inventors. They develop solutions to problems in the field of computer hardware and software.

**Software
Developers,
Systems Software**

They research, design, develop and programme, compile and programme the distribution of networks within the field of operating systems for medical, industrial, military, communications, aerospace, business, science and general applications. They establish operative specifications and formulate and analyse software requirements. They may design software for embedded systems. They apply the principles and techniques of computer science, engineering and mathematical analysis.

**Database
Administrators**

They administer, test and implement computer databases by applying knowledge of database management systems. They coordinate changes to computer databases. They may plan, coordinate and implement security measures to protect computer databases.

These are the companies that were analysed to identify the supply and demand of digital professionals in the Travel Tech sector

123compare.me	Barcelona e-bike rent
60by80	Barcelona green bites
Accelya	Barcelona zero limits
Acigrup hospitality software	Bdp
Adara	Be apartments
Ademas viajes	Bedooiin
Aervio	Beonprice
Agv globalabast	Beroni / wasabi-s
Ahora vuelvo mamá	Besailor
Airbnb	Bismart
Airdna	Bls
Airning	Bolrooms
Aitana	Booking
Ajuntament de barcelona	Bookipro pms sl
Aktios	Booklyng
Alhena production	Brin consultores tecnológicos
Alimentours.com	Brodynt global services
Alojapro	Broomx technologies
Altavisibilitat	Budgetplaces.com - engrande sl
Amfivia	Buscounviaje
Aparteasy	Busyhosts
Apartool	Byhours
Apartum	Camí de ronda
Apleaners	Capside
Artificial solutions	Caravelo
Atrapalo	Cashkeeper sl
Authenticitys	Catalonia hotels & resorts
Availpro	Catalunya en miniatura
Avanttic	Charteredart
Avoris travel - barcelo tri...	Chartok - hotel collaborati...
Avuxi	Citibeats
Aïda diodeplus	Citihood
Babyboo	City experience

Citygrum	Escuda sgsl s.l.
Clear peaks	Esebdex
Click it	Etamo business group
Clorian	Etban
Closer2event	Etic
Cloudguide	Everis
Concatel vanture team	Exoticca
Connectivity global sl	Expedia
Cubus games	Explorins
Delta informatica	Eztravel
Desico	Fama systems, s.a.
Digivision	Fantastiq transmedia
Divescover	Fast taxi
Dmi	Finisherbox
Dortoka disseny	Flykube
Dothegap	Foodie&tours
Doxa innova & smart	Friendly rentals
Drivania	Getting contacts,sl we go ...
Drumwit	Globetrotter vr
Dxc technology	Gna
Dynam.video	Go with oh
E&t3	Gomio
Easy travel	Googling
Eat boqueria tours	Gotaki
Ediversa	Greencustomers
Edreams	Grupo julià
Efimatica	Guestmate
Egluu	Guidd
Elogia	Guidemeup
Emascaro	Guies.cat
Engisoft	Gvcgaesco
Enso hospitality	Güell consulting
Enzyme advising group	H10 hotels
Epages	Happy people barcelona
Escapada rural	Here x now
Escapade	Highlight city

Higuests
Homeaway
Homelike
Hostmaker
Hotel investment partners
Hotelerum
Hotelpartner yield management
Hrowath htl - amburgada cap...
Hrs
Hub buikdings - habitat pro...
Icar
Ice
Icg software
Icm
Icode
Iconus
Idencity, transforming cities
Ijendu
Ikeybnb
Im projects
Immfly
Imotion analytics s.l.
Inbenta
Incyta multilanguage, sl
Informatica 3
Informática el corte inglés
Insidetravel barcelona
Instaroom
Instel
Intercom
Ist serveis informatics
Ithinkupc
Itinerarium
Iwanna travel
Iws
Japan rail pass

Kayak
Ketsapp
Kiddy's world
Kiploc
Kofax
Kycus communication
Labishi
Labtrip
Laforja sistemas, s.l.
Lambdaloopers
Le petit futé
Letsbonus
Linke
Lodgify
Mabrian
Magma hc
Masquelearning
Matesferia app
Mcrit
Media digital ventures
Mediapro
Mentor-vr
Merkle comet
Metriplica
Microblau colt
Microfocus
Microstrategy
Mind analytics
Minsait
Mirai
Moca platform
Modul 5
Moggyl open solutions, sl
Mosaic factor
Mr noow
Multiactiva mobile

Muster ventures
My room
Mycreativetours
Myhotelshop
Myrentalhost (full solution...
Mytwinplace
Nan-tic
Nattule
Nautal
New relic
Newshore
Nexus geographics
Niuimash
Niumba
Nixi1
Nomadesign
Nostrostudio
Novastock
Nscglobal
Nubart
Nucli
Oasis collections
Ofertia
Ok apartment barcelona - ho...
Olivia hotels, s.a.
Omnipresenz
One day cities
Onebox
Opentext
Opportumeety
Orpheo espagne sl.
Oxis real estate spain
Pa-community.com
Pangea
Papelaweb
Paradizo

Parkimeter
Pasiona
Passnfly
Penedes emotions sl.
Perception
Pere nalob
Perlatours
Ph systems
Planedia
Play&tour city guide
Playbrand
Playvisit
Pno innovation sl
Populetic
Port aventura
Portier
Prakton
Prestige software
Professional holiday rental...
Putput comunicacions
Quehaceren
Quonext
R&a interactius
Redsauce
Renovadora hotelera sl
Rentals united
Rentipro - vacation rental ...
Restaurantes.com
Reviewpro
Rewalia
Roca salvatella
Room for exchange
Roomleader
Roomonitor
Roomtab
Rudder technologies

Runroom	Sonar +d
Rural meeting technologies s.l	Splendia
Ruraldir	Sport by flag
Ruralmind	Spotsuite
Safe journey barcelona	Squarepoint capital partners
Saima solutions	Stoa
Salto connsulting group	Stravvel
Sdl	Subasta de ocio
Sdp	Sulcus solutions sl
Seastainable ventures	Summar tecnologia y gestion...
Seidor	Surfing stars live
Sensing & control	Synctur
Serenissima informatica	T-systems
Sf bcn	Tactic
Sfy	Tc group solutions
Sharify	Tcman
Sharryup - join the adventure	Tcpgrup - singular travel
Shr, sceptre hospitality re...	Techideas
Sibarit.us	Tesipro solutions
Sighore, s.l. (sighore-ics)	The hotels network
Sii concatel	The hotels network sl
Singular games	The love comes foundation
Sinqro	The rentals token
Sirt	Thelis
Skitude	Tlg commerce
Skiverse	Tourknife
Slash mobility	Trabber
Smadex	Tramisub, s.l.
Smartech	Traveely
Smartfocus	Travelclick
Smartlock	Travelperk
Smartlock	Trendditude
Socialwibox	Tripadvisor
Softeng	Triplist
Sogeti	Tripuniqu
Somrurals	Trovel.com

Tt consulting	Waytostay
Twister	Weroad
Twonav	Wimdu
U!dance	Witbooking
Udobu	X cale consulting
Unique visitors	Xceed
Universal customer	Xpirius
Universal holiday center	Yield planet
Unpuzzle barcelona	Yield revenue
Unsheeping	Yoplan
Uolala.com	Zapper
Urban district apartments	Zemsania
Urban resilience	Zinkdo
Urbiotica	
Urbuzzer	
Userzoom	
Vaanui	
Ventus technology sa de cv	
Verychic	
Via farmer	
Viajes big sur	
Viajes para ti s.l. (esquia...	
Viajes.com	
Viatges a la catalana	
Videoacustica	
Virtual software	
Vision360	
Visual led	
Vivelus	
Vivential value	
Vojo	
Voxel group	
Vreasy	
Vueling	
Wasabi produccions	
Waynabox	



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