AQU CATALUNYA

EMPLOYERS

THE OPINION OF EMPLOYERS REGARDING THE EDUCATION RECEIVED BY INDUSTRIAL TECHNOLOGY GRADUATES

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AQU CATALUNYA, 2021

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INTRODUCTION

Evidence-based proposals for improving study programmes

The primary goal of Agència per a la Qualitat del Sistema Universitari de Catalunya (Catalan University Quality Assurance Agency, AQU Catalunya) is to **contribute to the improvement of the university study programmes in the Catalan university system**. To achieve this goal, it is essential to benefit from evidence and data that demonstrate the performance of each study programme, thus facilitating decision-making by officials in charge of universities and study programmes, and politicians responsible for universities.

This report in particular provides evidence regarding the implementation and performance of study programmes in the subfield of Industrial Technology, gleaned from the results of the **2018 survey of employers in this sector**. The study programmes in this subfield have been categorised into six groupings (see Table 1). The annex to this report also lists the study programmes in each grouping and indicates which universities offer them.

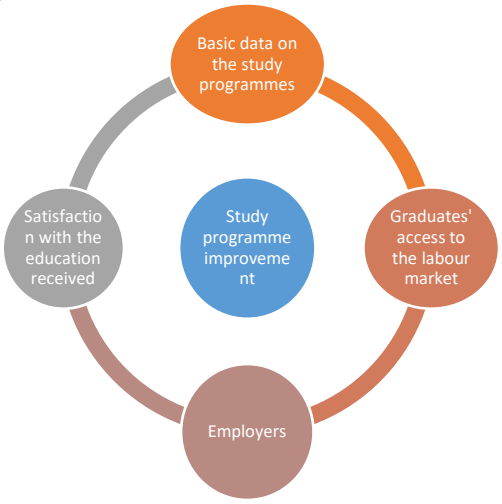
Table 1. Name and abbreviated name of the groupings, and a list of the study programmes in the subfield of Industrial Technology

Grouping name	Abbreviated name	Bachelor's degree programmes
Marine Engineering	Marine	Marine Technologies Nautical and Maritime Transport Marine Systems and Technology Engineering
Aerospace Engineering	Aerospace	Aerospace Technology Engineering Aerospace Systems Engineering Aerospace Vehicle Engineering Commercial Aircraft Pilot and Flight Operations Aviation Management
Electronic and Automation Engineering	Electr. and Automation	Electrical Engineering Industrial Electronics and Automation Engineering Energy Engineering
Mechanical Engineering and Industrial Design	Mechanical and Ind. Des.	Industrial Design Engineering Mechanical Engineering Mechatronics Engineering
Chemical and Materials Engineering	Chemical and Mat.	Chemical Engineering Textile Design and Technology Engineering Materials Engineering

Industrial Engineering and Organisation	Industrial and Org.	Industrial Technology Engineering Engineering in Industrial Organisation

This survey aims to shed light on the opinion of employers regarding the education received by the recent Industrial Technology graduates they have hired, particularly with regard to cross-disciplinary and specific skills exhibiting substantial room for improvement, among other issues.

Figure 1. Databases for improving study programmes



In addition to these results, the report includes an initial section with **contextual information on the Industrial Technology study programmes**. Here, **basic data on these programmes** are provided, as are the main results of two surveys: **one on recent graduates' satisfaction with the education received on these study programmes and another on their access to the labour market**.

INDICATORS ON THE STUDY PROGRAMMES IN THE INDUSTRIAL TECHNOLOGY SUBFIELD

Basic data on the study programmes

The basic data on the study programmes are of an administrative nature and come from two sources. Information on the availability of places is provided by the Inter-university Council of Catalonia (CIC); **all other data are taken from the UNEIX information system**. The annex to this report lists the study programmes in each of the following groupings and indicates which universities offer them. However, it should be noted that some of the Bachelor's degrees classified as belonging to a public university are in fact taught at affiliated centres, rather than the university itself.

Figure 2. Indicators on the implementation and performance of the Bachelor's degrees in the Marine Engineering grouping

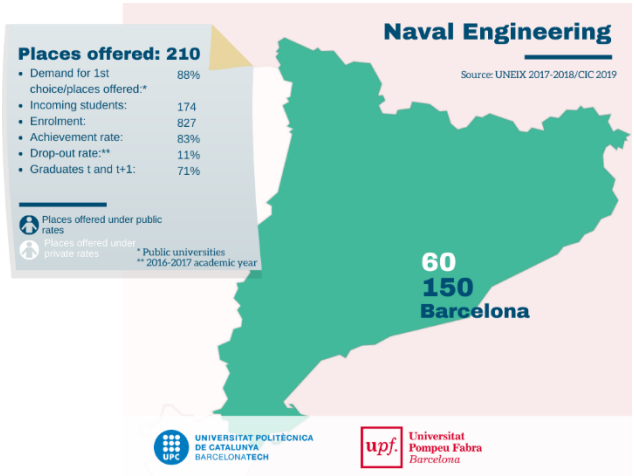
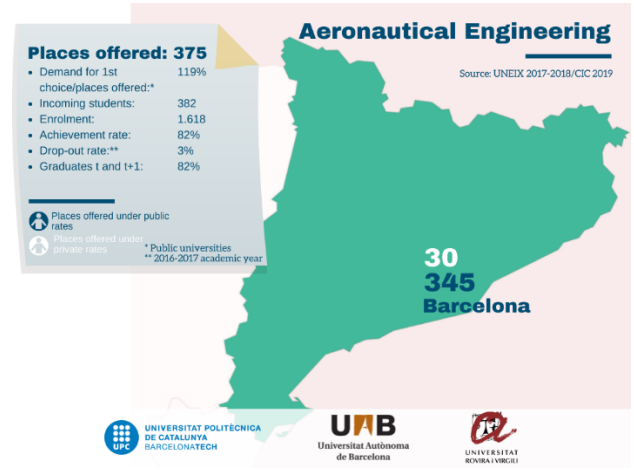


Figure 3. Indicators on the implementation and performance of the Bachelor's degrees in the Aerospace Engineering grouping



Industrial Technology study programmes generally display a balanced supply and demand

This balance occurs despite the positive career outcomes of graduates of these programmes (see section on graduates' access to the labour market).

However, the graduation rate varies considerably between the Industrial Technology groupings (between 61% and 82%).

If we compare the present data with those gathered for the ICT subfield (not shown), we see that the drop-out rate among Industrial Technology graduates is lower and the graduation rate, higher.

Figure 4. Indicators on the implementation and performance of the Bachelor's degrees in the Electronic and Automation Engineering grouping

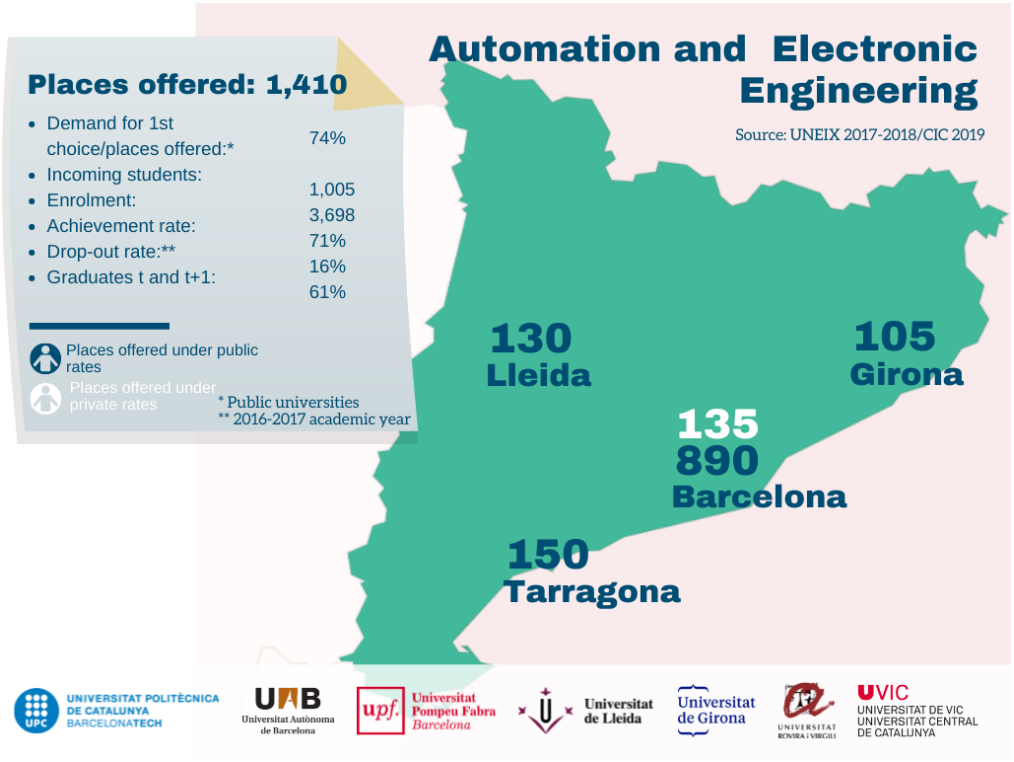


Figure 5. Indicators on the implementation and performance of the Bachelor's degrees in the Mechanical Engineering and Industrial Design grouping

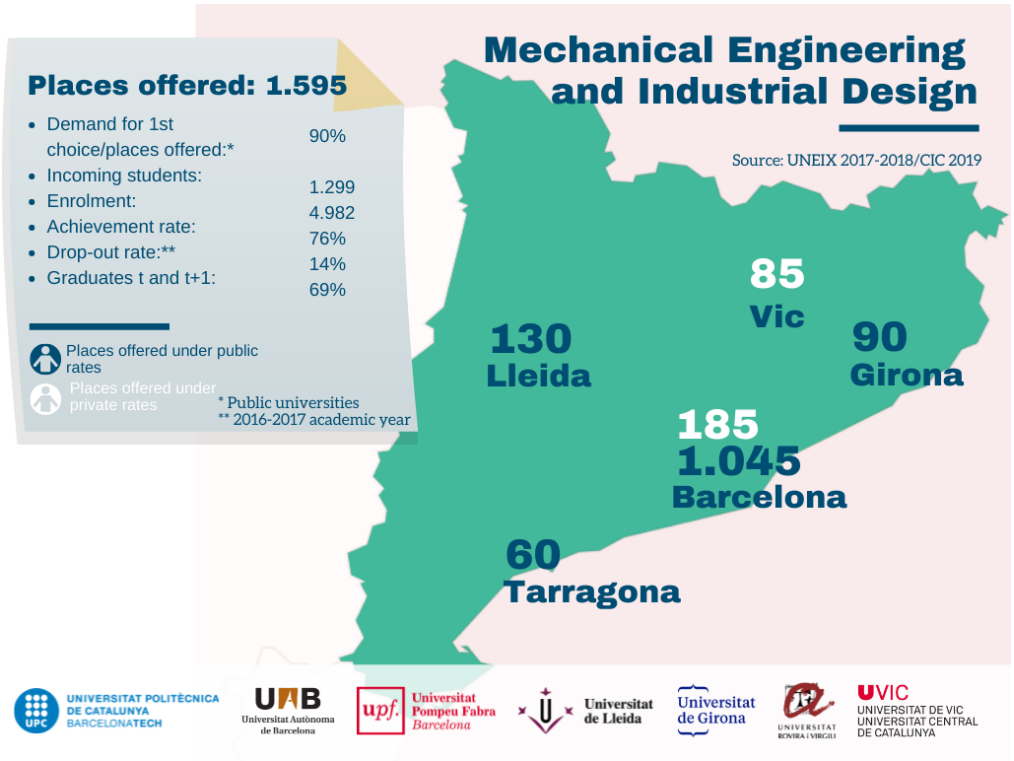


Figure 6. Indicators on the implementation and performance of the Bachelor's degrees in the Chemical and Materials Engineering grouping

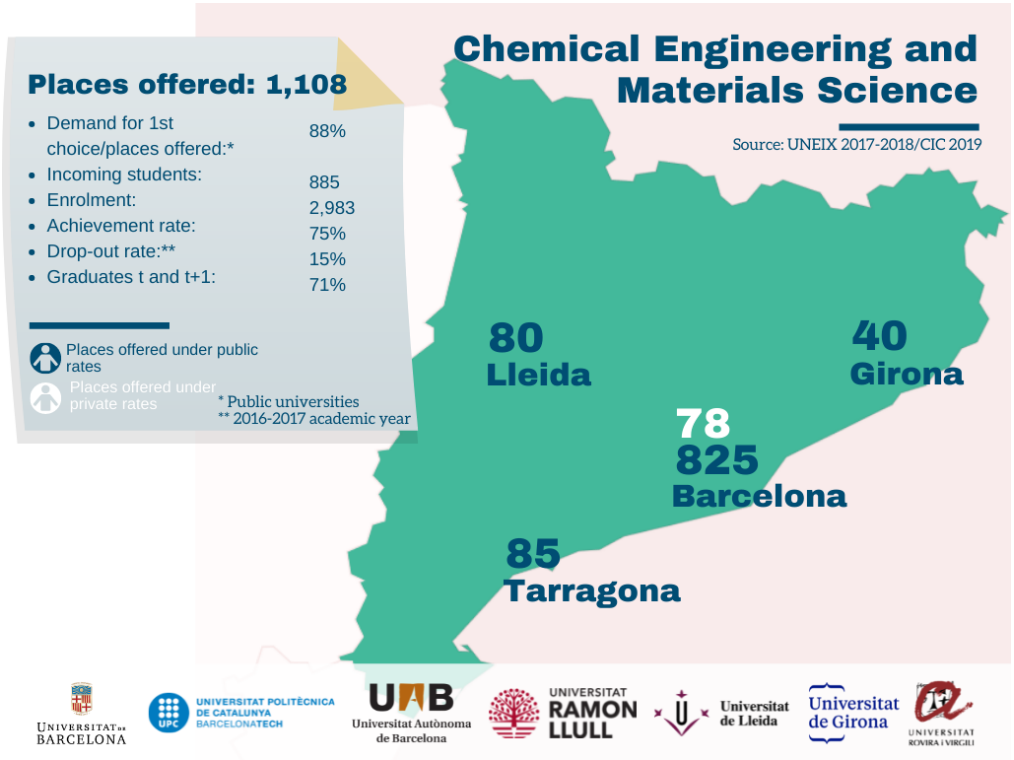
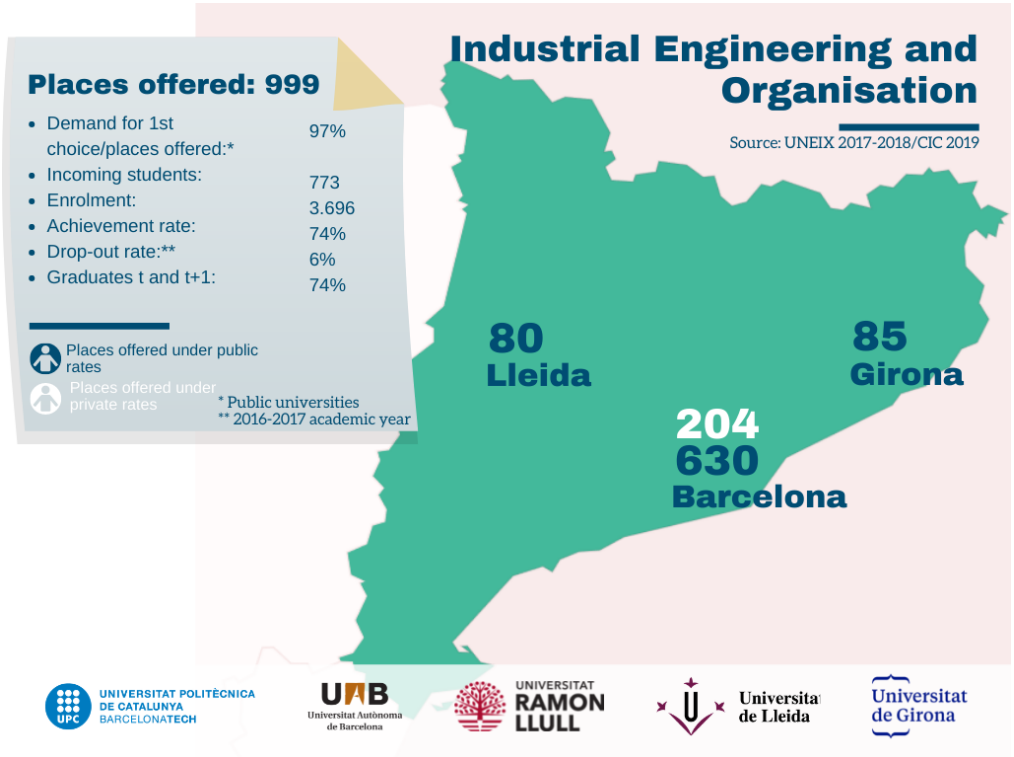


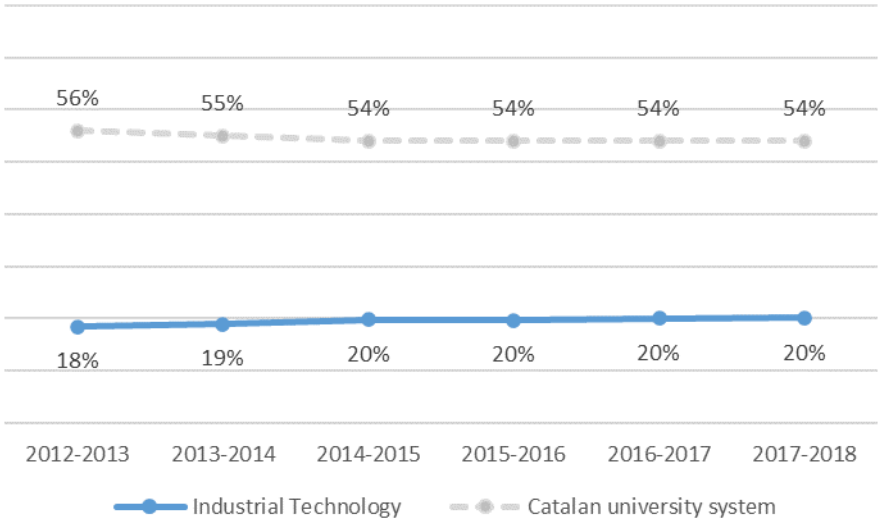
Figure 7. Indicators on the implementation and performance of the Bachelor's degrees in the Industrial Engineering and Organisation grouping



Only two out of ten students enrolled on Industrial Technology degrees are women, a far cry from the average for the Catalan university system as a whole

Both the ICT and Industrial Technology subfields have a much lower proportion of women than in the Catalan university system overall.

Figure 8. Trend in the percentage of women enrolled on Industrial Technology degrees compared to the entire Catalan university system



Graduates' satisfaction with their university education

Data regarding graduates' satisfaction with their education are taken from the **satisfaction survey** carried out by AQU Catalunya. The survey gathers information on graduates' satisfaction with various characteristics of the education they received on the university study programme they completed. It is an online survey conducted yearly on all the individuals who graduated one year earlier. The results shown are the averages in 2016, 2017 and 2018 for the subfields in question and the Catalan university system overall.

Figure 9. Graduates' satisfaction with how well their study programme helped them to improve (out of 10)

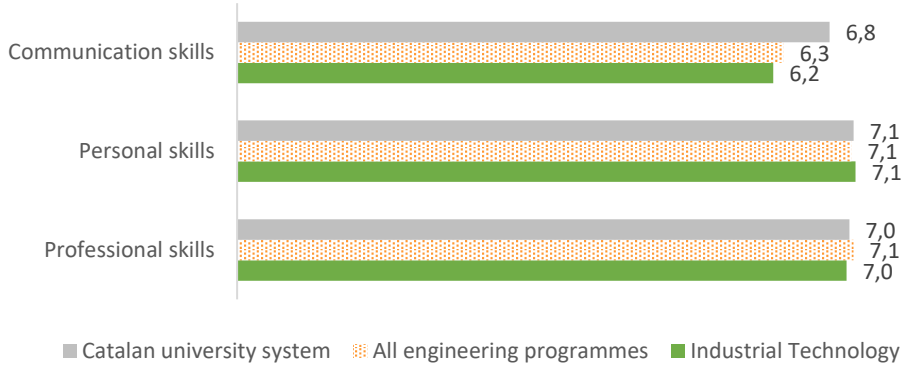


Table 2. Graduates' satisfaction with how well their study programme helped them to improve, broken down by Industrial Technology grouping (out of 10)

	Professional skills	Personal skills	Communication skills
Marine	6,3	6,2	6
Aerospace	6,5	7,3	6,2
Electr. and Automation	6,9	6,8	6,2
Mechanical and Ind. Des.	7	7,2	6,7
Chemical and Mat.	7,4	7,5	6,6
Industrial and Org.	7,2	7,1	5,5

Note: The colour and direction of the arrows reflect how the corresponding satisfaction ratings fare against the rest. Green arrows indicate the highest ratings, yellow arrows reflect average ratings and red arrows represent the lowest ratings.

Industrial Technology graduates' satisfaction with regard to improving their personal and professional skills is considerable, nearly matching the Catalan university system averages.

However, average satisfaction with respect to improving their communication skills stands at 6.2, falling short of the Catalan university system average of 6.8. Among the groupings of Industrial Technology degrees, Chemical and Materials Engineering and Mechanical Engineering and Industrial Design stand out in the ratings.

Figure 10. Satisfaction with the usefulness of external training placements and the Bachelor's degree final-year project (out of 10)

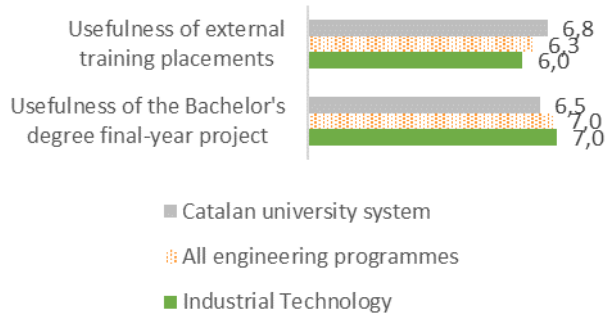


Table 3. Satisfaction with the usefulness of external training placements and the Bachelor's degree final-year project, broken down by Industrial Technology grouping (out of 10)

	Usefulness of the Bachelor's degree final-year project	Usefulness of external training placements
Marine	6,7	4,9
Aerospace	6,8	4,9
Electr. and Automation	7,4	6,4
Mechanical and Ind. Des.	7	6,3
Chemical and Mat.	7,7	6,4
Industrial and Org.	6,6	6

Industrial Technology graduates find the Bachelor's degree final-year project to be more useful than external training placements, unlike in the Catalan university system as a whole

Satisfaction with the usefulness of the Bachelor's degree final-year project stands at 7, one point above the usefulness of external training placements.

Within the Industrial Technology subfield, satisfaction is highest among graduates of Electronic and Automation Engineering and Chemical and Materials Engineering (especially with respect to the usefulness of the Bachelor's degree final-year project). Marine Engineering and Aerospace Engineering display significant room for improvement in both regards.

Figure 11. Overall satisfaction with the study programmes (out of 10)

Table 4. Overall satisfaction with the study programmes, broken down by Industrial Technology grouping (out of 10)

	Satisfaction
Marine	5,9
Aerospace	6,4
Electr. and Automation	6,9
Mechanical and Ind. D	7,1
Chemical and Mat.	7,3
Industrial and Org.	6,4

Overall satisfaction with the Industrial Technology degrees stands at 6.8, only a few decimals short of the Catalan university system average

The highest overall satisfaction ratings go to Chemical and Materials Engineering (7.3) and Mechanical Engineering and Industrial Design (7.1).

Graduates' access to the labour market

The survey on access to the labour market is conducted every three years with the aim of ascertaining university graduates' employment experience three years after completing their study programme. The results shown are from the latest survey, held in 2017, and are representative of both the universities and the study programmes involved. The Catalan university system results display the average for all study programmes taught in Catalonia. The results are weighted by a factor that corrects possible proportional variations in the sample.

Figure 12. Graduates' employment status in 2017

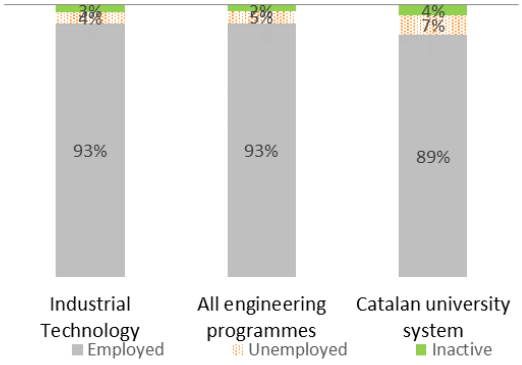


Table 5. Graduates' employment status in 2017, broken down by Industrial Technology grouping

	Employed	Unemployed	Inactive
Marine	82%	12%	6%
Aerospace	94%	4%	2%
Electr. and Automation	95%	3%	2%
Mechanical and Ind. Des.	91%	4%	4%
Chemical and Mat.	89%	9%	3%
Industrial and Org.	96%	2%	2%

There is an excellent rate of employment and performance of degree-specific job functions among Industrial Technology graduates

Among the graduates of Industrial Technology degrees, 93% are employed three years after completing their study programme, and 72% perform degree-specific functions at work. These rates are slightly higher than the Catalan university system averages. However, these rates vary substantially among the Industrial Technology groupings.

Figure 13. Functions performed at work according to the 2017 survey

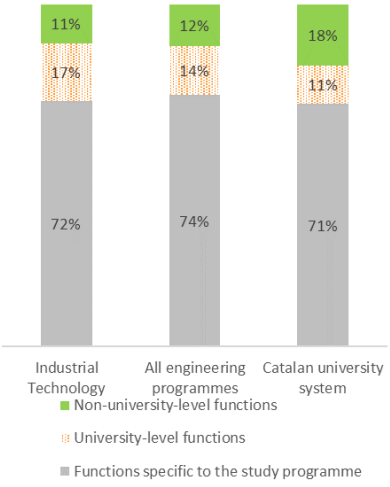


Table 6. Functions performed at work according to the 2017 survey, broken down by Industrial Technology grouping

	Functions specific to the study programme	University-level functions	Non-university-level functions
Marine	74%	10%	16%
Aerospace	64%	24%	12%
Electr. and Automation	71%	14%	15%
Mechanical and Ind. Des.	74%	14%	12%
Chemical and Mat.	67%	20%	13%
Industrial and Org.	74%	18%	7%

Table 7. Contract type in 2017

	Industrial Technology	All engineering programmes	Catalan university system
Permanent/open-ended	70%	62%	50%
Temporary	21%	21%	35%
Self-employed	6%	13%	11%
Other	3%	3%	4%
Total	100%	100%	100%

Table 8. Contract type in 2017, broken down by Industrial Technology grouping

	Marine	Aerospace	Electr. and Automation	Mechanical and Ind. Des.	Chemical and Mat.	Industrial and Org.
Permanent/open-ended	65%	72%	71%	64%	61%	78%
Temporary	25%	18%	19%	24%	30%	16%
Self-employed	3%	7%	7%	10%	3%	5%
Other	6%	3%	3%	2%	6%	1%
Total	100%	100%	100%	100%	100%	100%

Industrial Technology graduates also enjoy job stability and high salaries

Among these graduates, seven out of ten have a permanent contract three years after completing their study programme. This proportion outshines the Catalan university system average by 20 whole percentage points. Such job stability features in all the Industrial Technology groupings.

These graduates also enjoy high salaries: 74% have gross monthly salaries above €2,000, far exceeding the overall Catalan university system average of 41%.

Figure 14. Gross monthly salaries of full-time employees in 2017

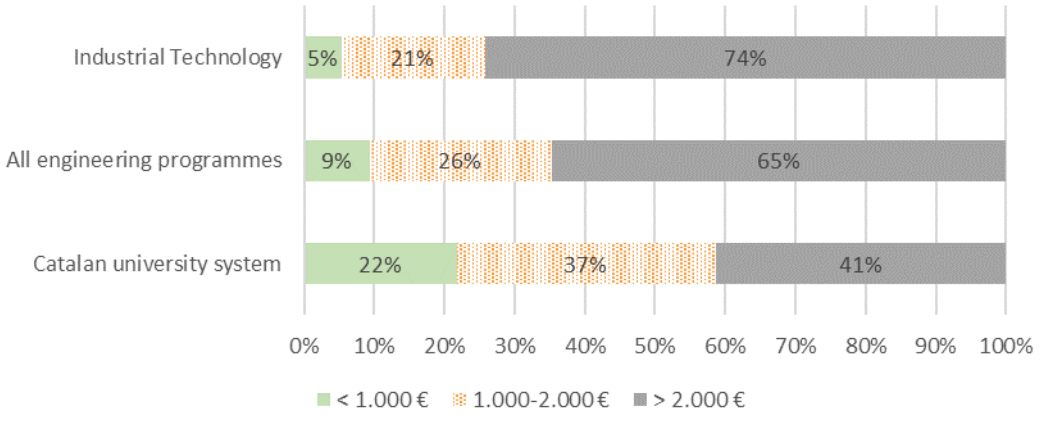


Table 9. Skills acquisition on the Industrial Technology degrees in 2017 (out of 10)

	Industrial Technology	All engineering programmes	Catalan university system
Theoretical knowledge	6.8	6.7	6.8
Practical knowledge	5.3	5.2	5.6
Oral expression	5.3	5.2	5.9
Written communication	5.4	5.3	6.3
Teamwork	6.9	6.8	6.8
Leadership	5	4.8	5
Problem-solving	7.1	6.8	6.1
Decision-making	5.9	5.9	5.8
Creativity	5	5.2	5.2
Critical thinking	6	6	6.5
Management	5.6	5.3	5.4
IT skills	6.1	6.1	5
Languages	3.1	3	3.7
Documentation skills	5.6	5.6	5.9

Problem-solving, teamwork and theoretical knowledge are the most highly rated skills of those acquired on Industrial Technology degrees

The outcome for problem-solving is especially high (7.1), standing one point above than the Catalan university system average.

Breaking down the figures, Chemical and Materials Engineering far outperforms the other groupings in terms of the level of skills acquisition it offers.

Meanwhile, language acquisition is far below par in all the groupings, as is the case with most Catalan university system degrees.

Table 10. Skills acquisition in 2017, broken down by Industrial Technology grouping (out of 10)

	Marine	Aerospace	Electr. and Automation	Mechanical and Ind. Des.	Chemical and Mat.	Industrial and Org.
Theoretical knowledge	6.2	6.7	6.7	6.7	7.3	6.7
Practical knowledge	3.4	5.1	5.7	5.3	6.1	4.8
Oral expression	4.8	5.2	5.6	5.8	5.9	4.6
Written communication	5.1	5.3	5.8	5.8	5.9	4.9
Teamwork	5.4	7.1	6.9	7	7.5	6.5
Leadership	4.7	5.2	4.9	4.9	5.8	4.7
Problem-solving	5.8	7	7	6.8	7.5	7.3
Decision-making	5.2	6.1	5.7	5.7	6.2	6
Creativity	3.9	4.3	5.1	5.7	5	4.7
Critical thinking	5.6	5.8	5.8	5.9	6.5	6.1
Management	4.6	5.3	5.3	5.5	6.2	5.8
IT skills	4.9	6.3	6.6	6.1	6.4	5.8
Languages	3	4	3.4	3.3	3.4	2.6
Documentation skills	4.9	5.8	5.8	5.8	5.8	5.3

Figure 15. Percentage of graduates willing to take the same study programme three years later

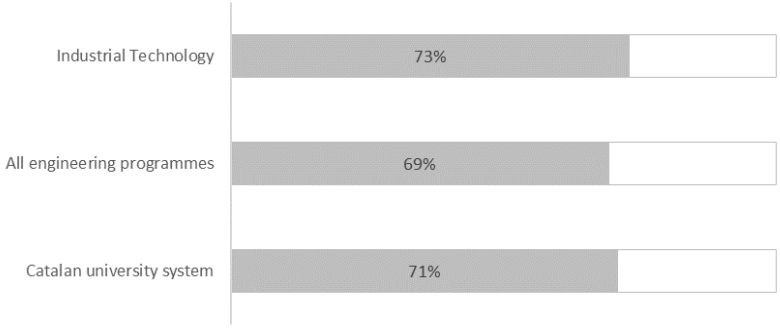


Table 11. Percentage of graduates willing to take the same study programme, broken down by Industrial Technology grouping

	%
Marine	67%
Aerospace	70%
Electr. and Automation	70%
Chemical and Mat.	72%
Mechanical and Ind. Des.	73%
Industrial and Org.	79%

Approximately seven out of ten graduates are willing to take the same Industrial Technology degree again

This figure is much higher than in similar industries, such as construction, where only five out of ten graduates would take their degree again.

Breaking down the data by Industrial Technology grouping, all the percentages are high, especially in the case of Industrial Engineering and Organisation (79%).

THE OPINION OF ORGANISATIONS REGARDING THE EDUCATION RECEIVED BY INDUSTRIAL TECHNOLOGY GRADUATES

Characteristics of the organisations participating in the survey

Figure 16. Classification of the organisations by number of employees (%)

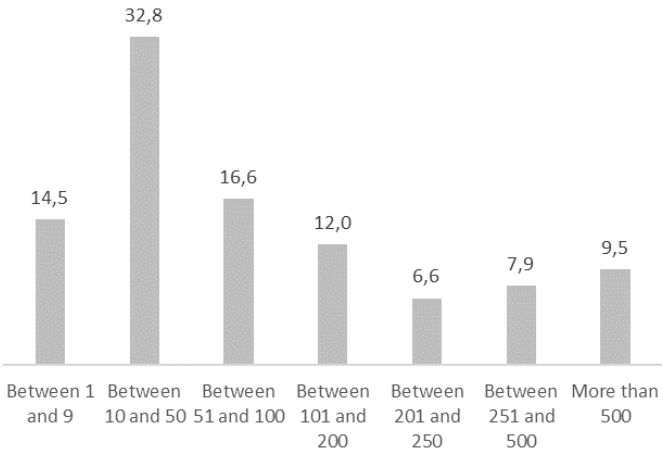
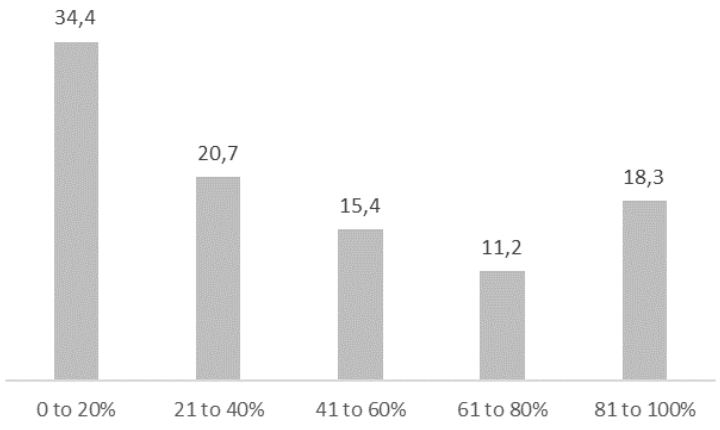


Figure 17. Classification of the organisations by percentage of employees with a university qualification (%)

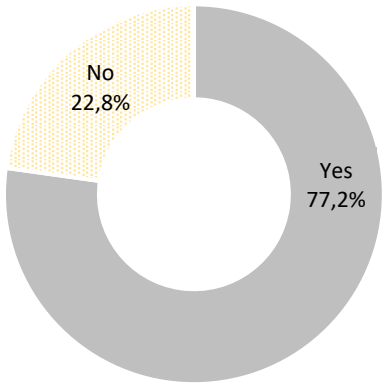


Half the organisations hiring Industrial Technology graduates are either medium-sized or large

Compared to other sectors considered in the Employers 2018 study, Industrial Technology boasts the highest representation of medium-sized and large enterprises. It should be remembered that most organisations making up the Catalan productive fabric are small and medium-sized enterprises.

Moreover, most staff in these organisations do not have a university qualification.

Figure 18. Organisations that have worked internationally



Roughly three out of four organisations have striven for internationalisation...

Industrial Technology stands out in the Employers 2018 study as one of the sectors with the most international activity. On average, the international market accounts for 47% of total sales and services.

Figure 19. International sales and services as a percentage of total sales and services

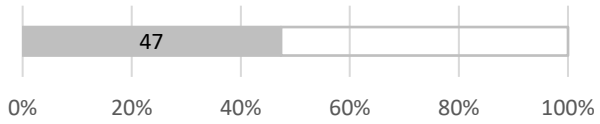
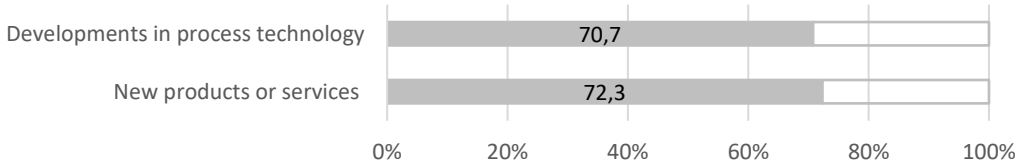


Figure 20. Organisations that have launched new developments in process technology and/or new products or services



Note: *new developments in process technology* refers to major changes in process technology, e.g. new machinery, software or management schemes, such as just-in-time manufacturing and quality and/or knowledge management. Meanwhile, *new products and services* are those that are entirely new on the market or to the company (or products and services that have been significantly improved).

...and also for innovation

Or the organisations surveyed, 71% claim to have made significant updates to their process technology (i.e. new equipment or software and/or new management schemes), and 72% have released new products or services onto the market or incorporated them into the company. Therefore, this subfield also stands out as one of the most innovative.

Hiring of individuals who have recently graduated in the subfield of Industrial Technology

Table 12. Number and percentage of organisations having hired recent graduates, broken down by Industrial Technology grouping

	n	%
Marine Engineering	4	2%
Aerospace Engineering	0	0%
Electronic and Automation Engineering	53	22%
Mechanical Engineering and Industrial Design	71	29%
Chemical and Materials Engineering	43	18%
Industrial Engineering and Organisation	70	29%
Total	241	100%

Given the insufficient number of organisations surveyed, from this point forward the Marine Engineering and Aerospace Engineering groupings will no longer be considered

They will, however, be counted in any totals referring to the Industrial Technology subfield as a whole (except for Aerospace Engineering, as no data is available).

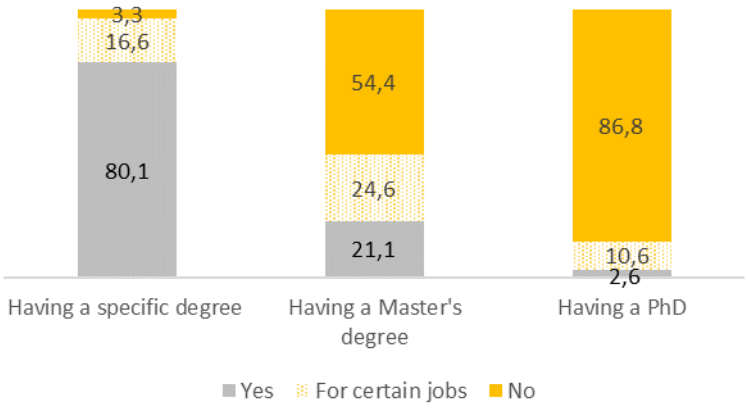
Table 13. Business activity of the employing entity

Activity	%
Agriculture, livestock, forestry and fishing / Extraction	2.5
Manufacturing	47.7
Electricity, gas and water	7.1
Construction	7.1
Trade and repair of motor vehicles / Transport and warehousing	5.8
Hospitality	0.4
Information and communications / Finance and insurance	2.1
Professional, scientific and specialist activities	12.4
Administrative activities and ancillary services / Public administration	2.9
Health and social services	1.2
Other	10.8
Total	100.0

Most of the organisations hiring recent Industrial Technology graduates are from manufacturing industries

Another 12% are organisations dealing in professional, scientific and specialist activities (mainly consulting).

Figure 21. Importance of higher education when hiring recent graduates (%)



Specific education at the Bachelor's degree level is important to most organisations when hiring

Master's degrees are important for nearly half the companies. They are most important for those hiring graduates from the Chemical and Materials Engineering and the Industrial Engineering and Organisation groupings. Moreover, some of the professions in question are regulated and can only be practised by individuals holding a specific qualification or a master's degree.

Whether or not graduates have a PhD, as in most sectors analysed, is irrelevant in hiring decisions.

Figure 22. Importance of higher education when hiring recent graduates, broken down by Industrial Technology grouping

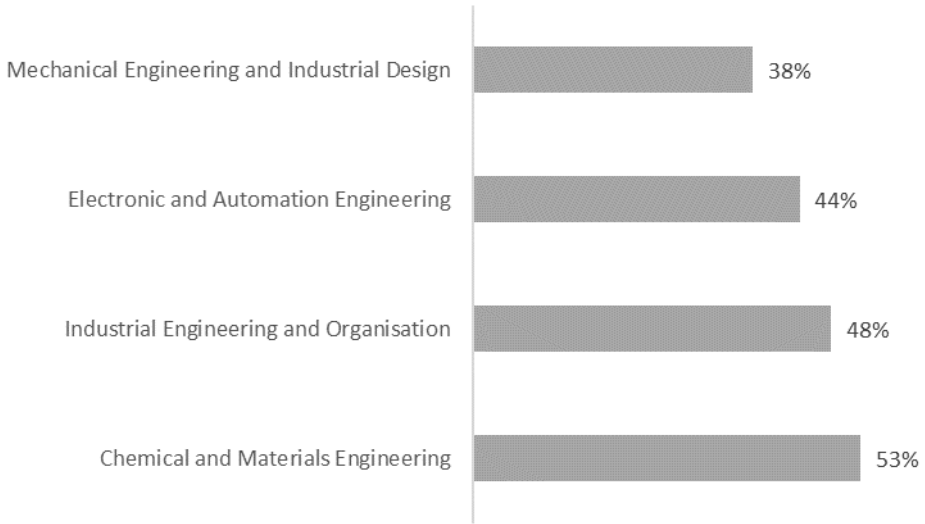
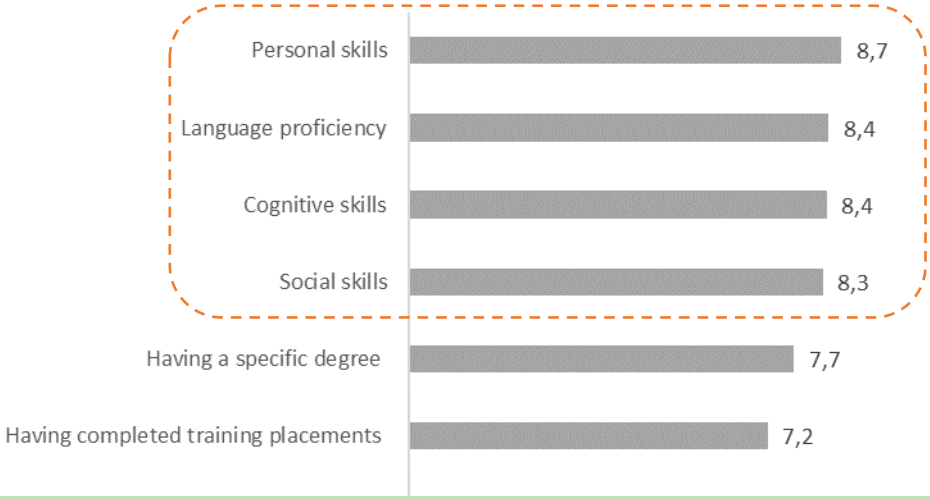


Figure 23. Importance of certain factors when hiring recent graduates (out of 10)

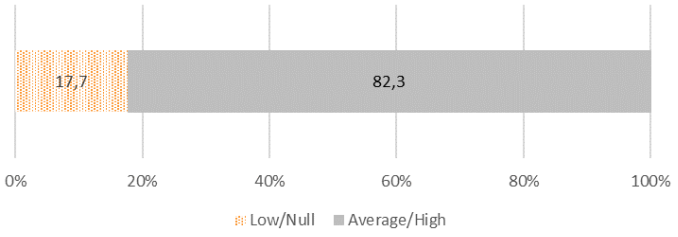


Personal, cognitive and social skills, together with language proficiency, carry the most weight in hiring decisions

This is true across all the Industrial Technology groupings (not depicted in the chart). The factor that sets this subfield apart from most other sectors analysed in the Employers 2018 study is how important language proficiency is.

The remaining factors, such as having completed international stays or the reputation of a person's university, carry less weight in hiring decisions, although the figures never dip below 5.

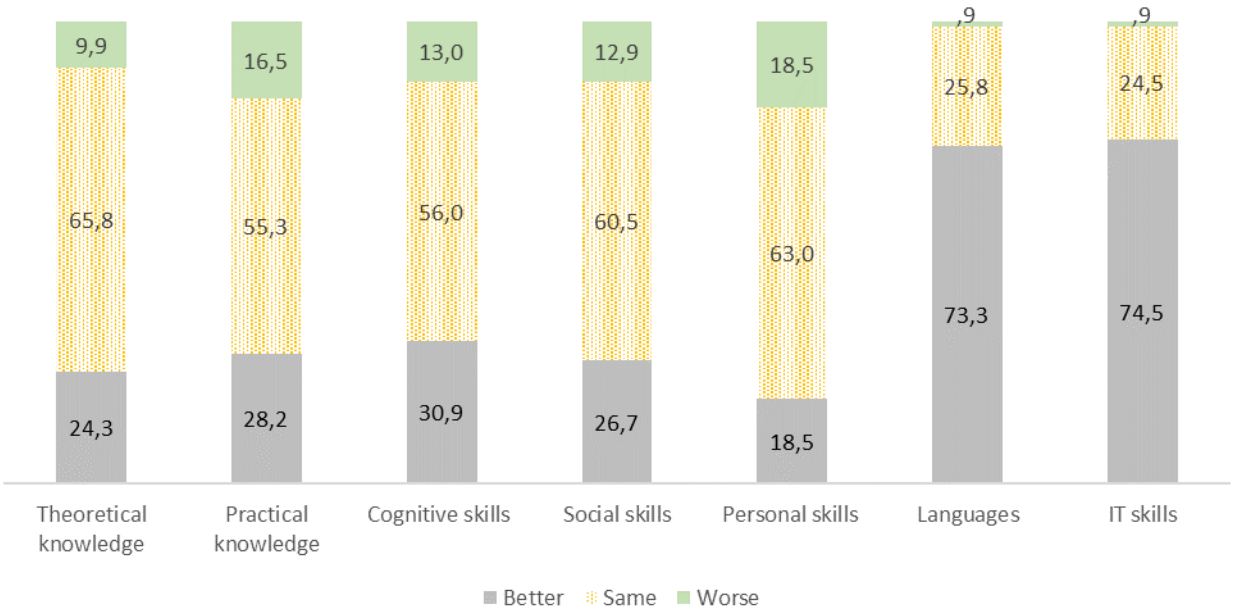
Figure 24. Suitability of recent Industrial Technology graduates to workplace needs



The education received by Industrial Technology graduates make them a good fit for the workplace

Of the organisations surveyed, 82% consider that Industrial Technology graduates are suited to workplace needs. Although this proportion seems high, it is comparatively one of the lowest in the Employers 2018 study, alongside that found in construction.

Figure 25. Current Industrial Technology graduates versus graduates from between five and ten years ago: have their skills improved, stayed the same or worsened?



The Industrial Technology study programmes have upped their game in recent years in terms of honing students language and IT skills

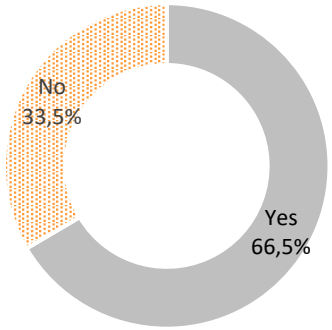
Among the companies surveyed, 73% say that graduates' language proficiency has improved; 75% say the same of IT skills. These two areas have seen the most improvement in all other sectors as well.

Meanwhile, over half the organisations surveyed see no change in the education of Industrial Technology graduates in terms of their theoretical and practical knowledge, cognitive skills (e.g. problem-solving, critical thinking and creativity), social skills (e.g. teamwork and emotional intelligence) and personal skills (e.g. responsibility, initiative and autonomy).

It should be noted that, of all the sectors analysed, Industrial Technology has given the most promising feedback regarding how well the education provided by these study programmes has improved over time.

Hiring difficulties

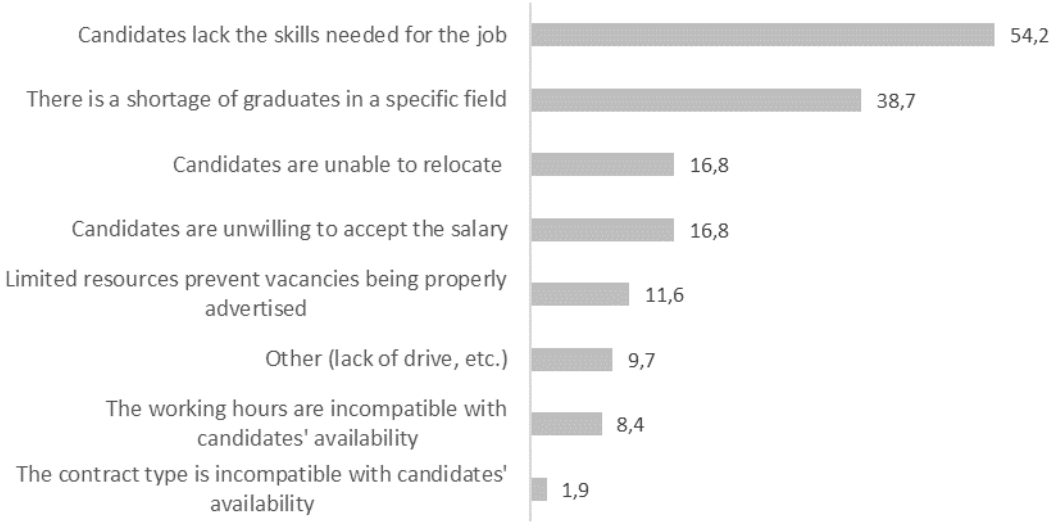
Figure 26. Organisations having encountered difficulties in hiring staff with the right profile



Of the organisations surveyed, 67% claim to have faced hiring difficulties

This figure is one of the highest in the Employers 2018 study, coming in 25 percentage points above the outcome of the 2014 survey for the productive sector as a whole (42%).

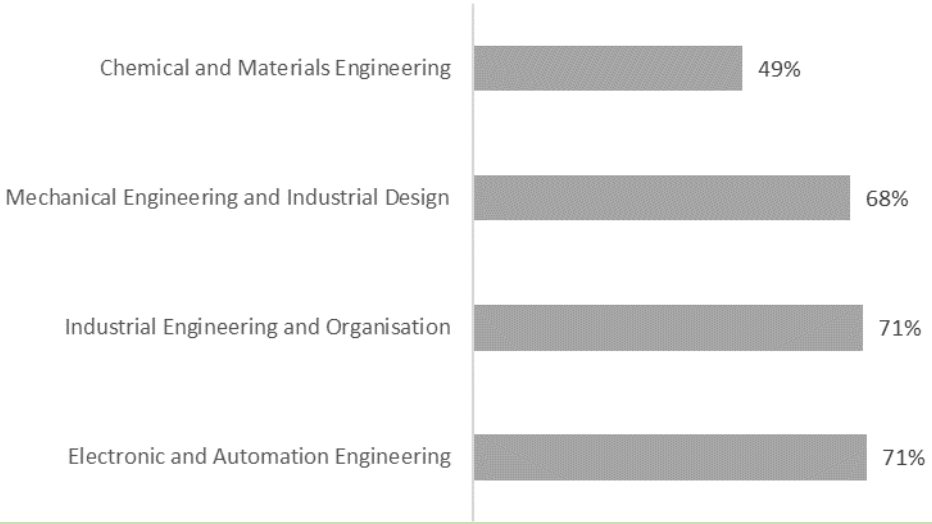
Figure 27. Difficulties in hiring staff with the right profile (% of organisations)



Graduates' lack of skills needed for the job and a shortage of graduates in a specific field are the main causes of these difficulties

Among the organisations having faced hiring difficulties, 54% claim that candidates do not possess the skills needed for the job, as seen in most of the other sectors analysed. Curiously enough, a surprising 39% identify a shortage of graduates in a specific field.

Figure 28. Percentage of organisations having encountered difficulties in hiring staff with the right profile, broken down by Industrial Technology grouping



The organisations looking to hire graduates from the Industrial Engineering and Organisation and Electronic and Automation Engineering groupings have the hardest time finding staff with the right profile

Specifically, 71% of these organisations say they have encountered difficulties.

Skills of recent graduates

Table 14. Cross-disciplinary skills that need to be better honed on study programmes in the subfield of Industrial Technology

	Percentage of companies
Documentation skills	4.1
Numeracy skills	4.6
Theoretical knowledge	6.6
Ability to use the most common IT tools	7.6
Learning and self-learning	15.7
Leadership	16.2
Oral expression	16.8
Negotiation skills	17.3
Teamwork	20.3
Written communication	23.9
Responsibility at work	35.5
Self-reliance at work	36.5
Ability to offer new ideas and solutions	38.1
Languages	39.6
Problem-solving and decision-making	52.3
Practical knowledge	56.9

Problem-solving and decision-making, taken together, and practical knowledge top the list of skills found lacking in Industrial Technology graduates

These shortcomings are felt by over half the organisations surveyed. It should be noted, however, that these cross-disciplinary skills tend to need improving in most degrees in Catalonia.

Furthermore, roughly one out of three organisations identify the need to better hone graduates' language proficiency, creativity, and self-reliance and responsibility at work.

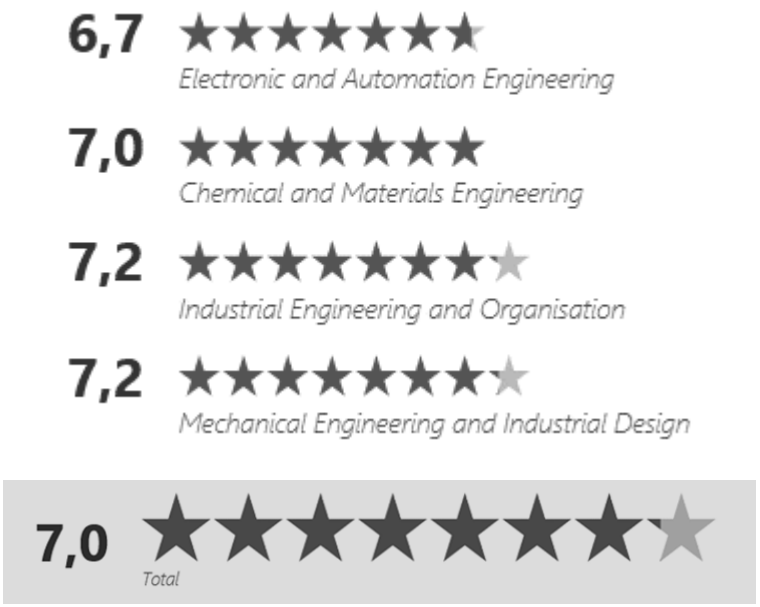
Table 15. Specific skills that need to be better honed on Industrial Technology study programmes

	Percentage of companies
Ability to harness science and technology to improve the level of well-being in society	7.4
Ability to manage the environmental and social risks of the solutions adopted	10.4
Ability to use software that is specific to the professional activity performed	11.4
Ability to manage research, development and technological innovation	14.9
Ability to integrate knowledge and make judgements based on incomplete or limited data	21.8
Ability to promote quality in the organisation, its customers and suppliers	23.8
Ability to ensure occupational safety by anticipating risks and preventing them	26.7
Ability to manage different environments both technically and financially	30.2
Ability to manage, organise and oversee multidisciplinary teams, especially in multilingual environments	30.7
Ability to offer objective solutions while under the constraints and pressures of differing interests	34.2
Ability to communicate effectively with people without technical training	37.6
Ability to plan, map out, calculate, design and execute technical actions in a given field of specialisation	40.6
Ability to apply knowledge and solve problems in new and unfamiliar environments	45.0

With regard to specific skills, practical knowledge, effective communication and problem-solving under pressure stand out as needing the most improvement

By practical knowledge we mean (1) the ability to apply knowledge and solve problems in new and unfamiliar environments, and (2) the ability to plan, map out, calculate, design and execute technical actions in a given field of specialisation.

Figure 29. Employers' overall satisfaction with the skills of recent Industrial Technology graduates (out of 10)



Employers display considerable satisfaction with the skills of recent Industrial Technology graduates

Indeed, despite any shortcomings in the education received, organisations are generally satisfied with the skills of the recent graduates whom they have hired. Overall satisfaction stands at 7.0, which is very similar to the average satisfaction rate of employers in other sectors analysed.
The level of satisfaction is higher in Industrial Engineering and Organisation and in Mechanical Engineering and Industrial Design, coming in at 7.2 in both cases.

University-employer collaboration

Figure 30. Extent to which organisations collaborate with universities, broken down by activity type (%)

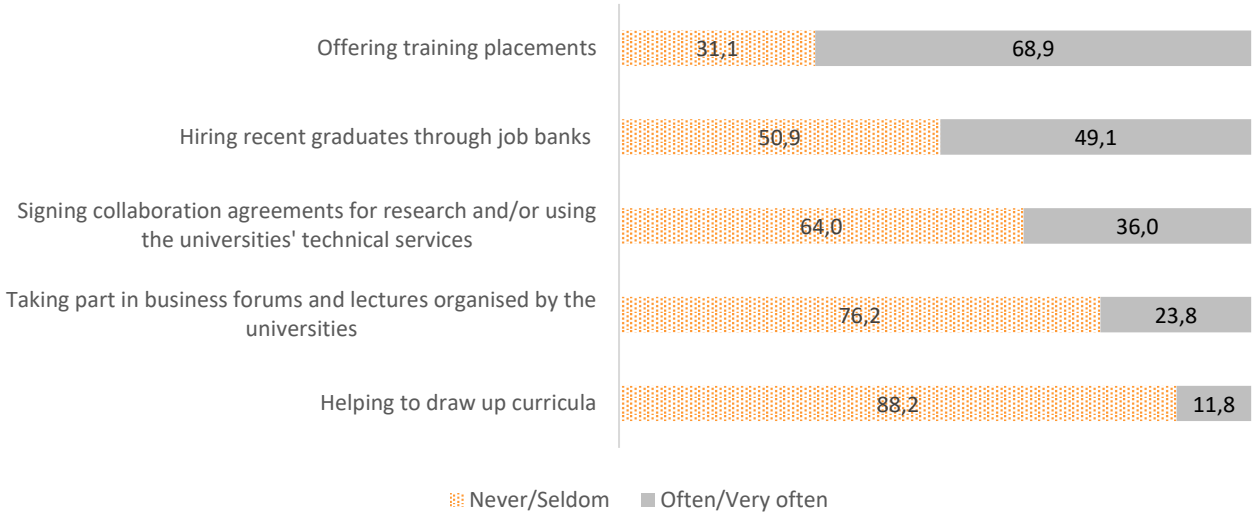


Figure 31. Areas for improvement in universities' job bank and training placement services (% of organisations)

Figure 32. Overall satisfaction with universities' job bank and training placement services (out of 10)

The university activities in which organisations participate the most are related to training placements and job banks

As in all other sectors analysed in the Employers 2018 study, company-university collaboration most often means offering training placements to university students (69% of organisations collaborate in this way) and hiring recent graduates through job banks (49%).

The level of satisfaction among organisations having made use of these services is 7, akin to other sectors in the Employers 2018 study. The organisations do, however, underline that universities could handle the administrative procedures more swiftly and find out more about their needs.

n-organisation training of recent graduates

Figure 33. Organisations funding training for recent graduates

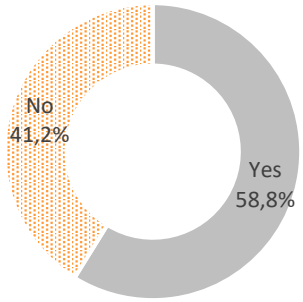


Table 16. Type of training funded by organisations

	%
On-the-job training	71.1
During working hours	79.9
Outside of working hours	37.5

Figure 34. Reasons for funding training (% of organisations)

Over half the organisations fund training for their newly hired recent graduates

Roughly seven out of ten provide on-the-job training during working hours. For most organisations, the purpose of this training is to enhance employees' sector-specific knowledge and to familiarise them with the company's characteristics and culture.

Outlook

Figure 35. Skilled employment outlook in the subfield of Industrial Technology

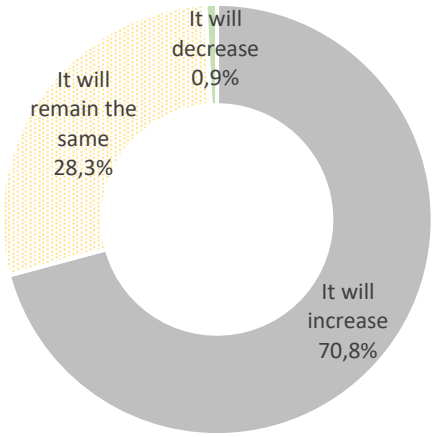


Table 17. Reasons for the increase in employment

Reasons	%
Company expansion	70.2
Technological or organisational changes	41.0
Employee turnover	15.5
Other	6.8

Note: the survey-takers could check multiple answers.

*Figure 36. Skills that will become more important in the subfield of Industrial Technology**

*These answers are the result of open-ended questions. Answers with the same meaning have been grouped into overarching terms. Only the terms appearing at least six times are shown.

Organisations in this subfield have a positive outlook: seven out of ten foresee an increase in skilled employment

Language proficiency and the ability to use new technologies will gain the most importance in coming years.

CONCLUSIONS

- The demand for places on study programmes in the subfield of Industrial Technology does not generally outweigh the number of places available. However, achievement rates are relatively low. Likewise, these Bachelor's degrees (along with those in the subfield of ICT) exhibit the lowest proportions of women enrolled.
- Compared to the Catalan university system as a whole, Industrial Technology graduates seem to be less satisfied the usefulness of the external training placements and, just the reverse, more satisfied with the usefulness of the Bachelor's degree final-year project.
- These graduates enjoy solid access to the labour market, with rates slightly exceeding the Catalan university system average. Likewise, the percentage of graduates who perform functions specific to their study programme is high. Industrial Technology graduates also enjoy job stability and high salaries.

Organisations hiring Industrial Technology graduates exhibit the following characteristics:

- Half the organisations hiring graduates in this subfield are medium-sized and large enterprises in which most staff do not have a university qualification. These companies primarily deal in manufacturing and, to a lesser extent, consulting. They are active internationally and show a tendency towards innovation.
- Having a specifically required qualification is a key factor in these organisations' hiring decisions. Moreover, a respective 45 and 13% of organisations consider holding a Master's degree and a PhD a plus. Also weighing in their decisions are candidates' personal, cognitive and social skills, as well as their language proficiency.
- Of the organisations surveyed, 67% have encountered difficulties in finding staff with the right profile, mainly due to candidates' lack of skills needed for the job and a shortage of graduates in a specific field.

Regarding university education:

- In terms of cross-disciplinary skills, problem-solving and decision-making, taken together, and practical knowledge top the list of skills found lacking in Industrial Technology graduates. This shortcoming is felt in other sectors as well. There is also a standout need to improve graduates' language proficiency, creativity and self-reliance at work.
- Regarding the specific skills taught on Industrial Technology study programmes, nearly half the organisations surveyed find graduates lacking in practical knowledge, i.e. the ability to apply knowledge and solve problems in new and unfamiliar environments, and the ability to plan, map out, calculate, design and execute technical actions in a given field of specialisation. A significant proportion also believe that graduates have room to improve when it comes to communicating effectively and solving problems under pressure.
- Despite these shortcomings, seven out of ten employers are satisfied with the overall skills of the recent graduates they have hired.
- As in other sectors, company-university collaboration most often means offering training placements to university students (69% of organisations collaborate in this way).
- Roughly seven out of ten organisations foresee an increase in skilled employment thanks to business expansion.
- According to the organisations surveyed, language proficiency and the ability to use new technologies will gain the most importance in coming years.

DATA SHEET

Employer survey

Population	Organisations that may have hired recent graduates from universities located in Catalonia in the last three years[1]
Survey period	Online survey: from 26/02/2018 to 16/03/2018 Telephone survey: from 27/06/2018 to 5/07/2018
Survey type	Online and by telephone
Average time taken	Telephone survey: 14' 59''

	Population	Sample
Organisations potentially from the Industrial Technology sector	Not available	241
Total number of organisations	30,018	

Satisfaction survey (2018)

Grouping (graduates from 2016, 2017 and 2018)	Population	Sample	Response rate	Sampling error
Marine Engineering	336	85	25.3%	9.2%
Aerospace Engineering	758	227	29.9%	5.4%
Electronic and Automation Engineering	1,409	404	28.7%	4.1%
Mechanical Engineering and Industrial Design	1,872	472	25.2%	3.9%
Chemical and Materials Engineering	1,169	300	25.7%	4.9%
Industrial Engineering and Organisation	1,710	602	35.2%	3.2%

Survey on access to the labour market (2017)

Grouping (graduates from 2013)	Population	Sample	Response rate	Sampling error
Marine Engineering	126	77	61.1%	7.0%
Aerospace Engineering	190	100	52.6%	6.8%
Electronic and Automation Engineering	699	359	51.4%	3.6%
Mechanical Engineering and Industrial Design	524	304	58.0%	3.6%
Chemical and Materials Engineering	457	250	54.7%	4.2%
Industrial Engineering and Organisation	888	447	50.3%	3.3%

[1] Most of the organisation contacts were made through the Catalan universities' job banks.

DRAFTING COMMITTEE

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ANNEX. RELATED STUDY PROGRAMMES

Bachelor's degrees offered in the 2018/2019 academic year

Marine Engineering

	UPC	UPF
Marine Systems and Technology Engineering	✓	
Logistics and Maritime Business		✓
Nautical and Maritime Transport	✓	
Marine Technologies	✓	

Aerospace Engineering

	UAB	UPC	URV
Aerospace Systems Engineering		✓	
Aerospace Technology Engineering		✓	
Aerospace Vehicle Engineering		✓	
Aviation Management	✓		
Commercial Aircraft Pilot and Flight Operations			✓

Electronic and Automation Engineering

	UAB	UPC	UPF	UdG	UdL	URV
Energy Engineering		✓				
Energy and Sustainability Engineering					✓	
Electrical Engineering		✓		✓		✓
Industrial Electronics and Automation Engineering	✓	✓	✓	✓		✓
Industrial Electronics and Automation Engineering					✓	

Mechanical Engineering and Industrial Design

	UAB	UPC	UPF	UdG	UdL	URV	UVic-UCC
Automotive Engineering		✓					
Industrial Design Engineering			✓				
Industrial Design Engineering and Product Development		✓					
Automotive Engineering							✓
Mechanical Engineering	✓	✓	✓	✓	✓	✓	
Mechanical Engineering							✓

Chemical and Materials Engineering

	UB	UAB	UPC	UdG	UdL	URV	URL
Materials Engineering	✓		✓				
Textile Design and Technology Engineering			✓				
Chemical Engineering	✓	✓	✓		✓		
Chemical Engineering				✓		✓	✓
Nanoscience and Nanotechnology		✓					

Industrial Engineering and Organisation

	UAB	UPC	UPF	UdG	UdL	URL
Industrial Organization			✓			
Engineering in Industrial Organisation	✓					
Industrial Organisation and Logistics Engineering					✓	
Industrial Technology Engineering		✓		✓		✓
Industrial Technologies and Economic Analysis		✓				

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