intride

Soft, Digital and **Green Skills** for **Smart Designers**: Designers as Innovative Triggers for SMEs in the manufacturing sector

Study about the “Soft, Digital & Green” critical competencies that a designer should have to successfully deploying innovation in SMEs manufacturing habitat products — Spanish report

WP3. Field analysis of state of the art — June 2020

CENFIM Furnishings Cluster

ELISAVA Barcelona School of Design and Engineering

LEITAT managing technologies

Co-funded by the Erasmus+ Programme of the European Union

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Objectives and methodology of the investigation

In the framework of the INTRIDE European project, among 5 universities, 3 clusters and 2 technology centres we are preparing a new **Master course for Designers focused on "Soft, Digital & Green“ additional skills.**

We believe that **designers** will need these **additional "Soft, Digital & Green" competences,** in addition to the creative ones, to become **real triggering agents and key catalysts of innovation** in **SMEs manufacturing habitat products**.

What are the priority "Soft, Digital & Green" skills that a designer should have in order to successfully deploy innovation in SME manufacturing habitat product?

This was exactly the answer we wanted to get through this research. We have our own opinion and intuition about it, but... we want the contents of this Master to be in tune with the **real needs and expectations of companies in our environment.**

That is why we have **asked and interviewed 20 SMEs / professionals in the habitat product manufacturing sector** in Catalonia. This document presents the **main results and conclusions of this research**, carried out through a survey during May 2020.

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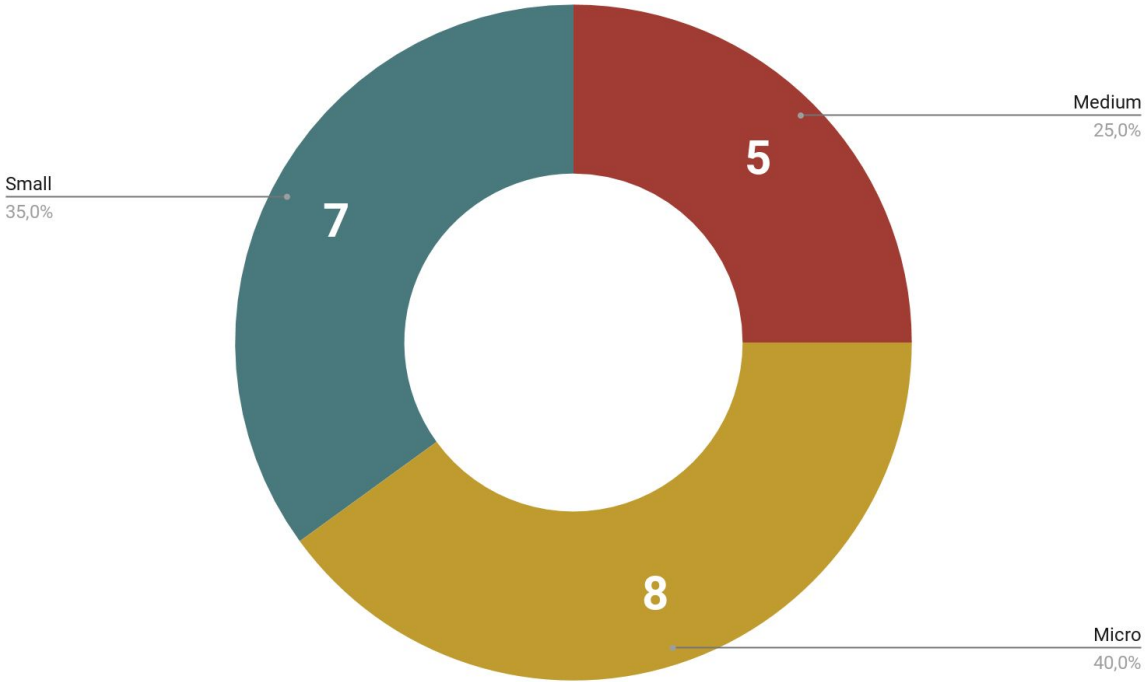
Business profile

What is the size of your company?



All companies that participated to this survey are SMEs

Micro companies ≤ 9 employees
Small companies: > 9 and ≤ 49 employees
Medium: > 50 and < 250 employees.

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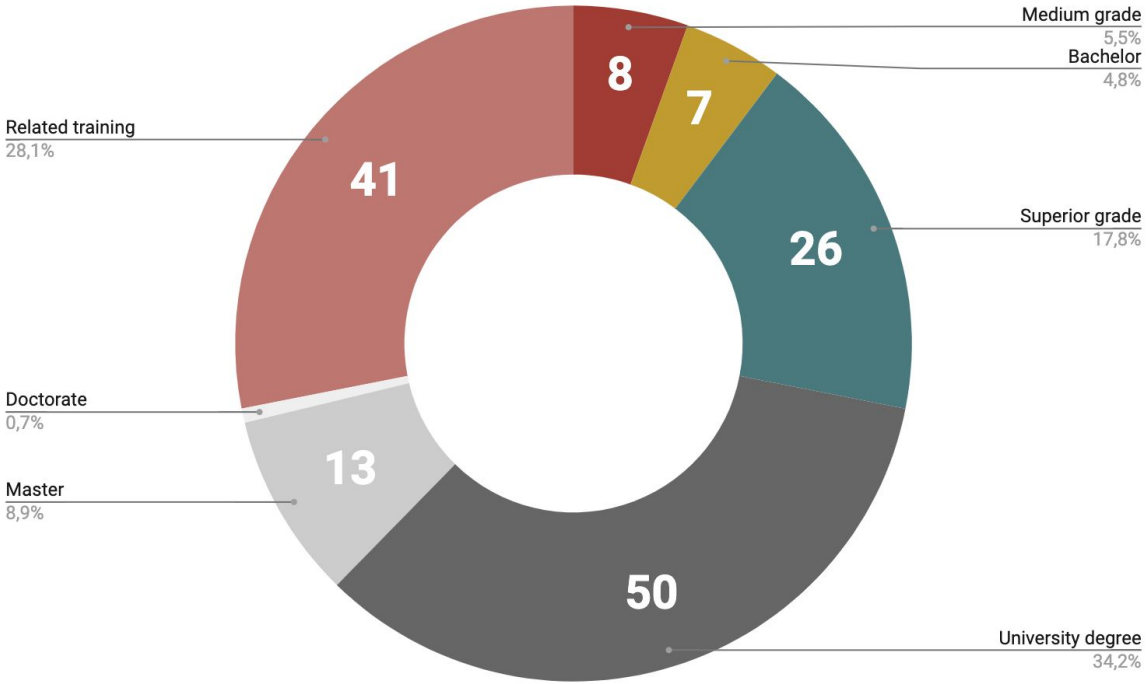
Employees profile



Indicates the number of employees involved in the product development processes in the company based on their level of training.

Most of employees involved in product development processes are university graduates or have design-related training. On average, there are 6 people in each company working in product development.

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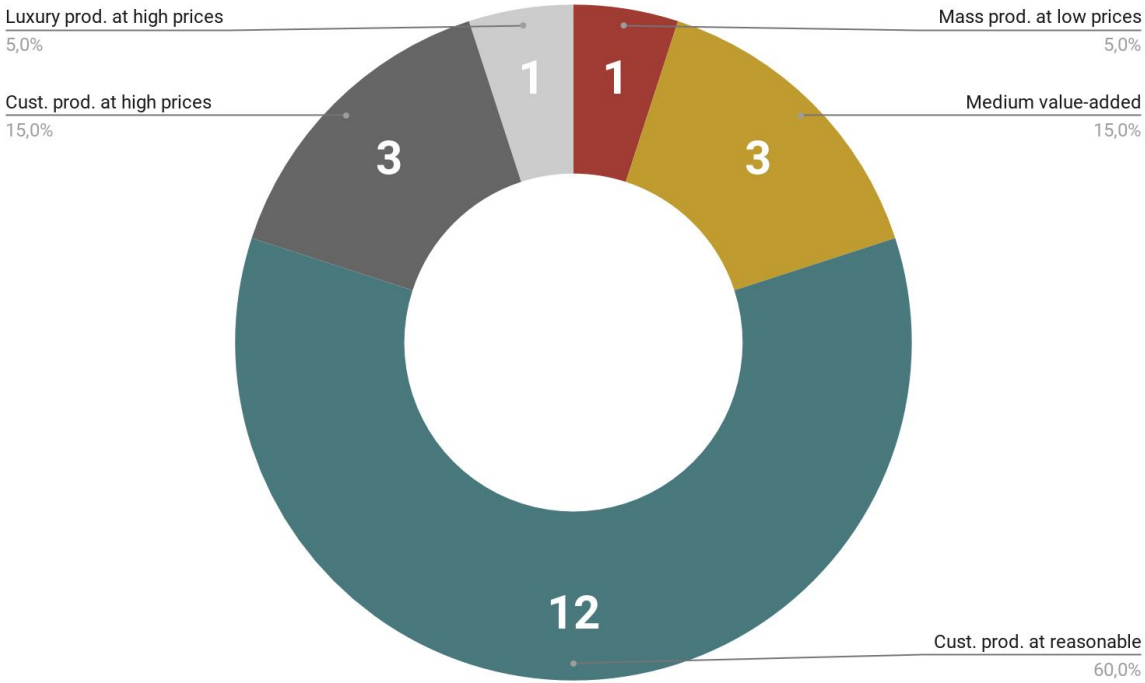
Products type



How would you describe your products / services?

Most companies offer customized products at reasonable prices (60%) or at high prices (15%).

Just a minority are at the extremes, offering luxury products at high prices (5%) or mass products at low prices (5%).

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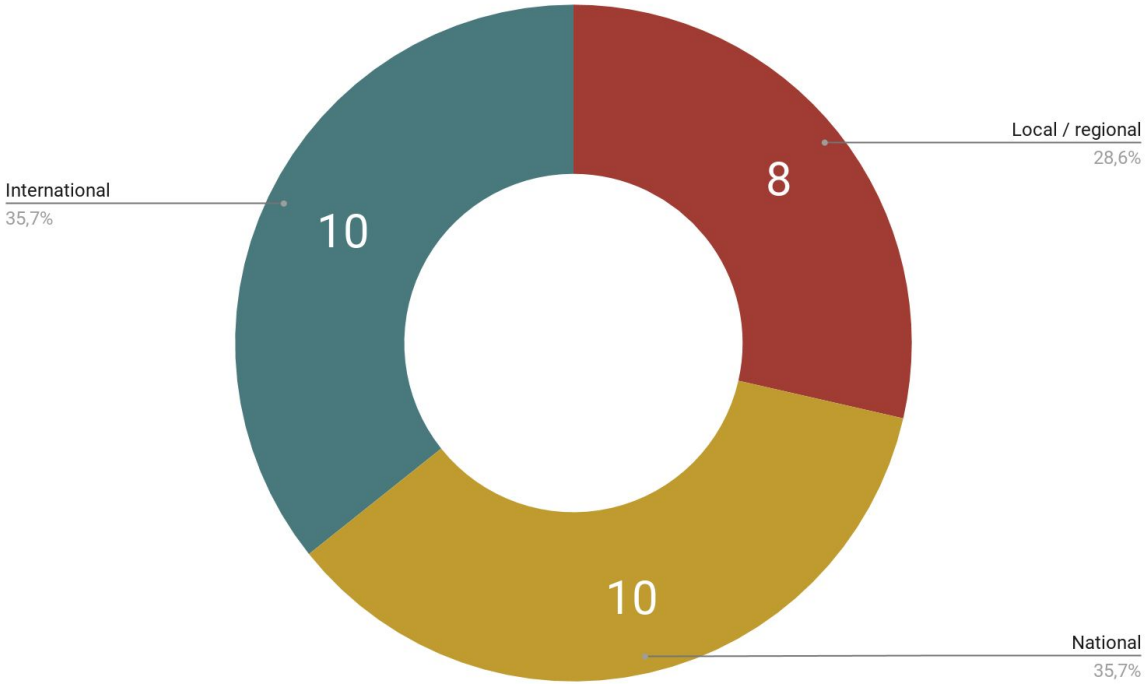
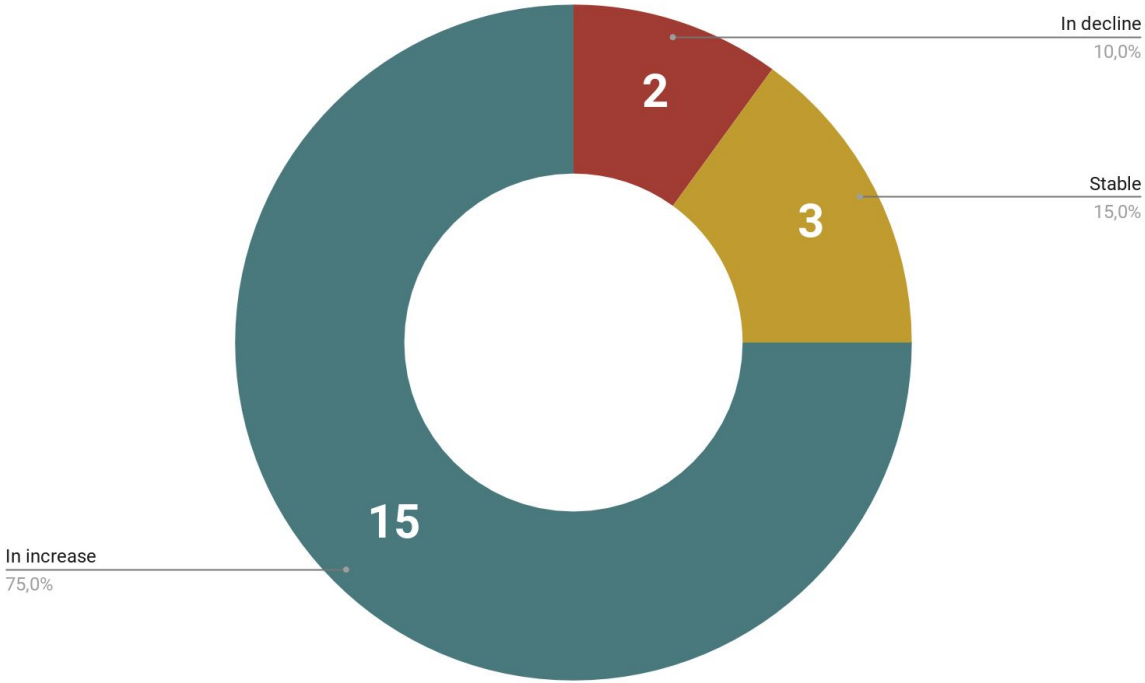
Target markets



What are your company's target markets? If you are present in the international market, what are the most important target countries?

The 36% of interviewed companies operate in international markets. The main markets are France, the United Kingdom, the United States and the United Arab Emirates.

Competitiveness



How do you consider the competitiveness of your company?

The 75% of companies consider that their competitiveness is increasing.

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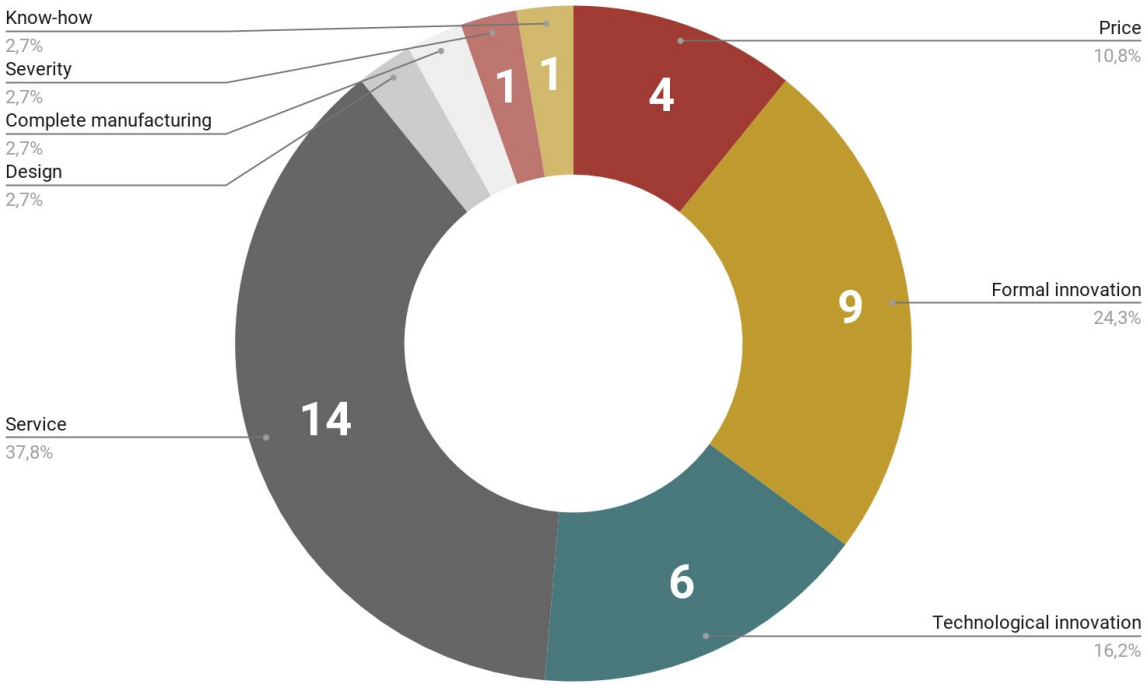
Most competitive element



What is the most competitive element of your company?

Many of the companies, 38%, bet on the "service" as the most competitive element, and it makes sense considering that their vast majority offers customized products.

Also "formal innovation" (24%) and "technological innovation" (16%) are key elements for the competitiveness of these companies.

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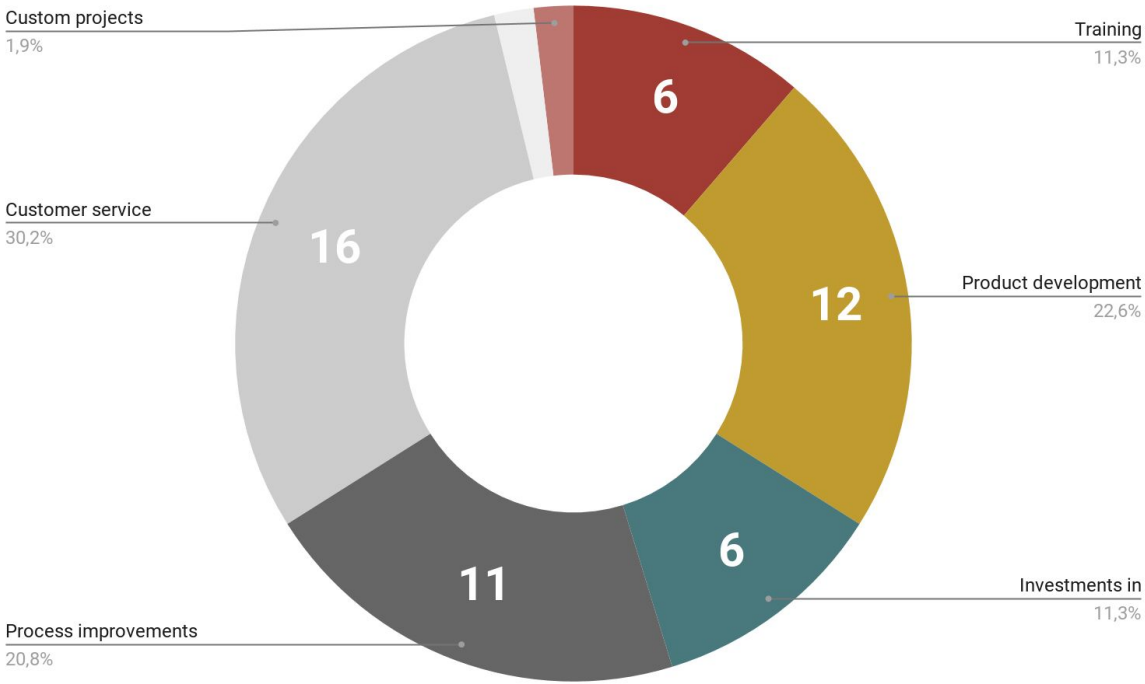
Maintain competitiveness



How do you maintain your competitiveness?

This graphic is closely related to the previous one, as it shows that companies maintain their competitiveness through the "customer service" (service), the "product development" (formal innovation) and "process improvement" (technological innovation).

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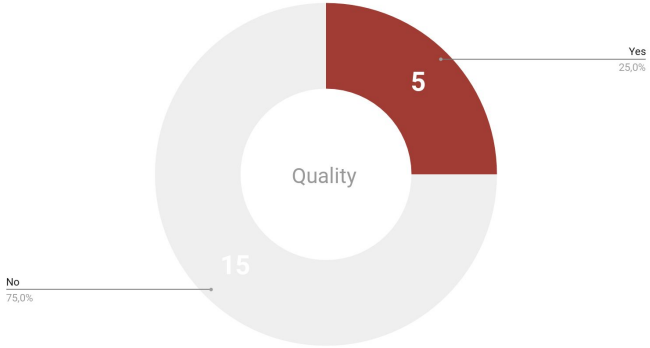
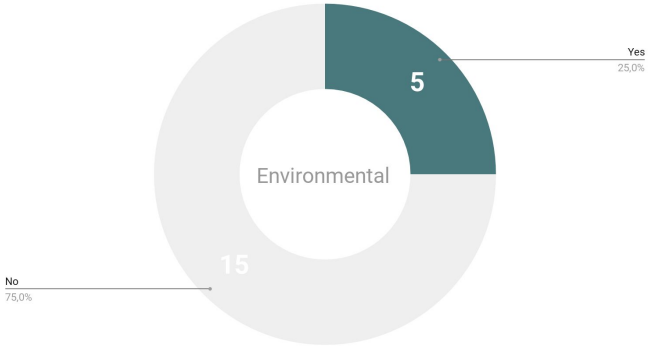
Certified management systems

Does the company have a certified quality / environmental management system?





The 25% of the companies have a quality assurance certification (ISO 9001). The 25% also have an environmental certification (ISO 14001, Conformity of Certification or ISO 14006). Companies that have a quality certification are the same number of those that have an environmental certification.

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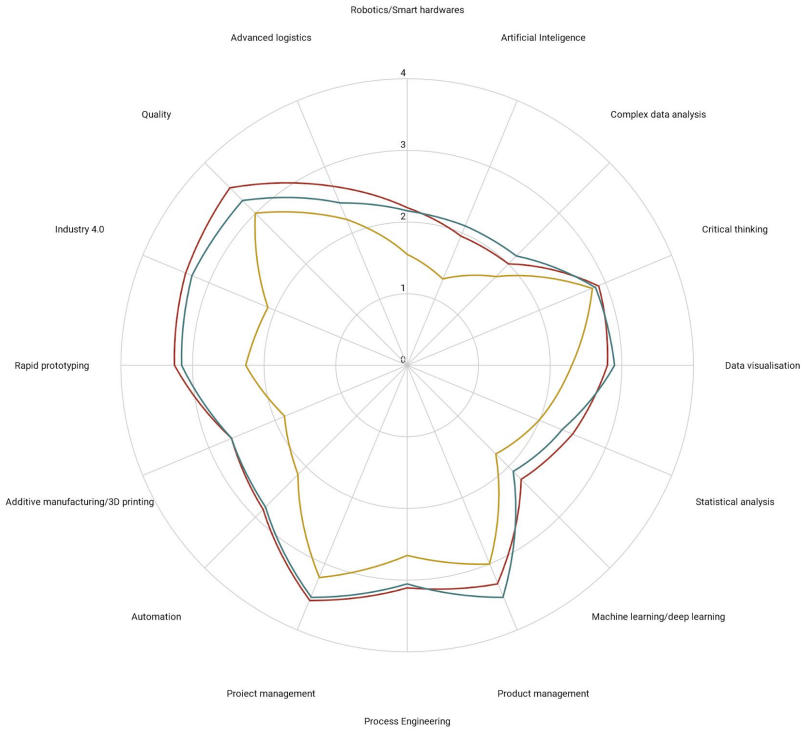
Competences

- How do you consider the following competences to be important for your company?
- Currently, which of the following competences are you strong at?
- Indicates the level of commitment to improve the following competences in the near future (next 3-5 years).
- Do you have possibilities to train your employees in the competences mentioned above?

Technological competences



Importance
Strength
Commitment to improve

This graphic shows the average score of the "importance", "strength" and "commitment to improve" for the interviewed companies of their technological competencies, being 0 = not important and 4 = very important.

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Technological competences

IMPORTANCE	WEAKNESS	COMMITMENT TO IMPROVE
Project management	**Artificial Intelligence**	**Product management**
Quality	**Robotics/Smart hardwares**	**Project management**
Industry 4.0	**Complex data analysis**	**Industry 4.0**
Product management	**Machine learning/deep learning**	**Quality**
Rapid prototyping	**Additive manufacturing/3D printing**	**Rapid prototyping**
Process Engineering	**Statistical analysis**	**Process Engineering**
Critical thinking	Industry 4.0	Data visualisation
Automation	Automation	Critical thinking
Data visualisation	Advanced logistics	Automation
Advanced logistics	Rapid prototyping	Additive manufacturing/3D printing
Additive manufacturing/3D printing	Data visualisation	Advanced logistics
Statistical analysis	Process Engineering	Statistical analysis
Machine learning/deep learning	Critical thinking	Robotics/Smart hardwares
Robotics/Smart hardwares	Product management	Complex data analysis
Complex data analysis	Quality	Artificial Intelligence
Artificial Intelligence	Proiect management	Machine learning/deep learning

Importance (+ to –)
Weakness (- to +)
Commitment to improve (+ to –)

The first column shows the technological competencies in descending order according to their score in "importance". Those competencies with an average score of 3 or more are shown in bold.

The third column shows the same type of analysis for the criterion "commitment to improve".

In contrast, the second column shows the technological competencies in ascending order according to their "weakness", as opposed to the criterion "strength" presented in the graphic of the previous slide. Those competencies with an average score of 2 or less are shown in bold.

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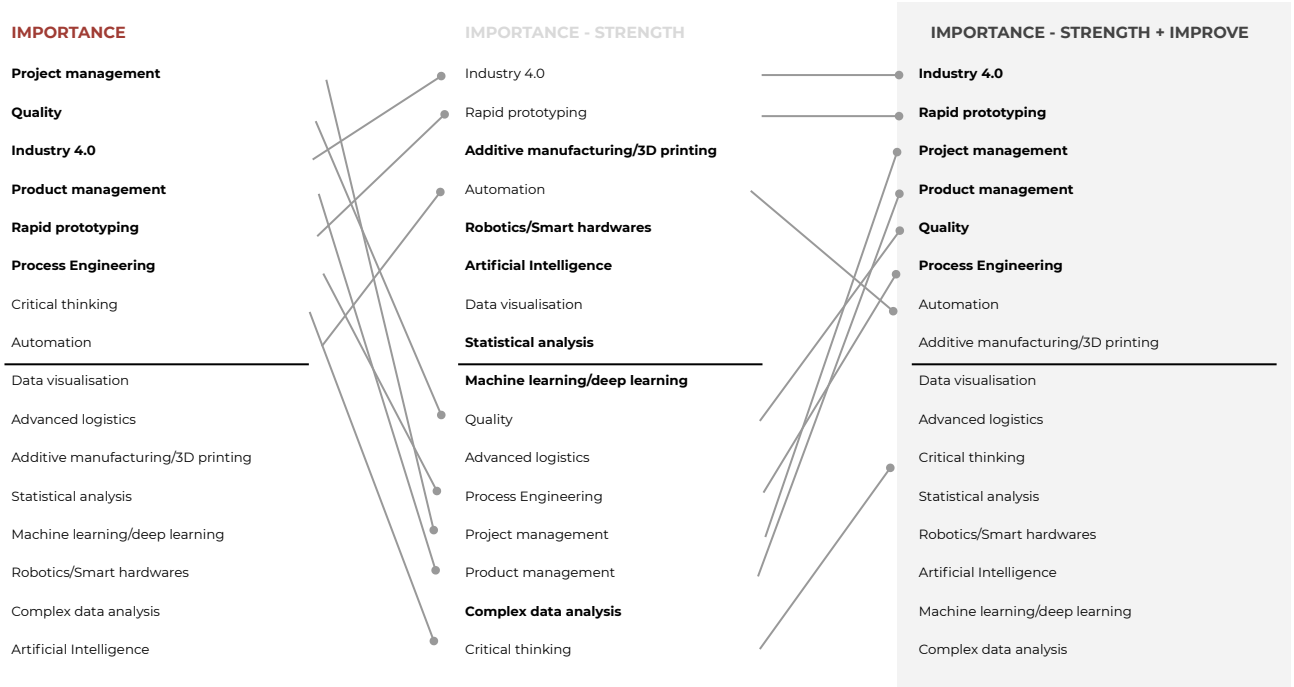
Technological competences



- *Importance*
- *Should be trained in*
- *Conclusion*

The first column shows the technological competences in descending order according to their score in "IMPORTANCE".

The second column shows the competencies in descending order according to their score in IMPORTANCE - STRENGTH.

And finally, the third column shows the competencies in descending order according to their score resulting from IMPORTANCE - STRENGTH + IMPROVE.

This third column shows the technological competencies in descending order of priority for the interviewed companies considering jointly the three evaluated criteria.

The arrows show the displacement of the competences that have obtained a higher score in IMPORTANCE (upper half).

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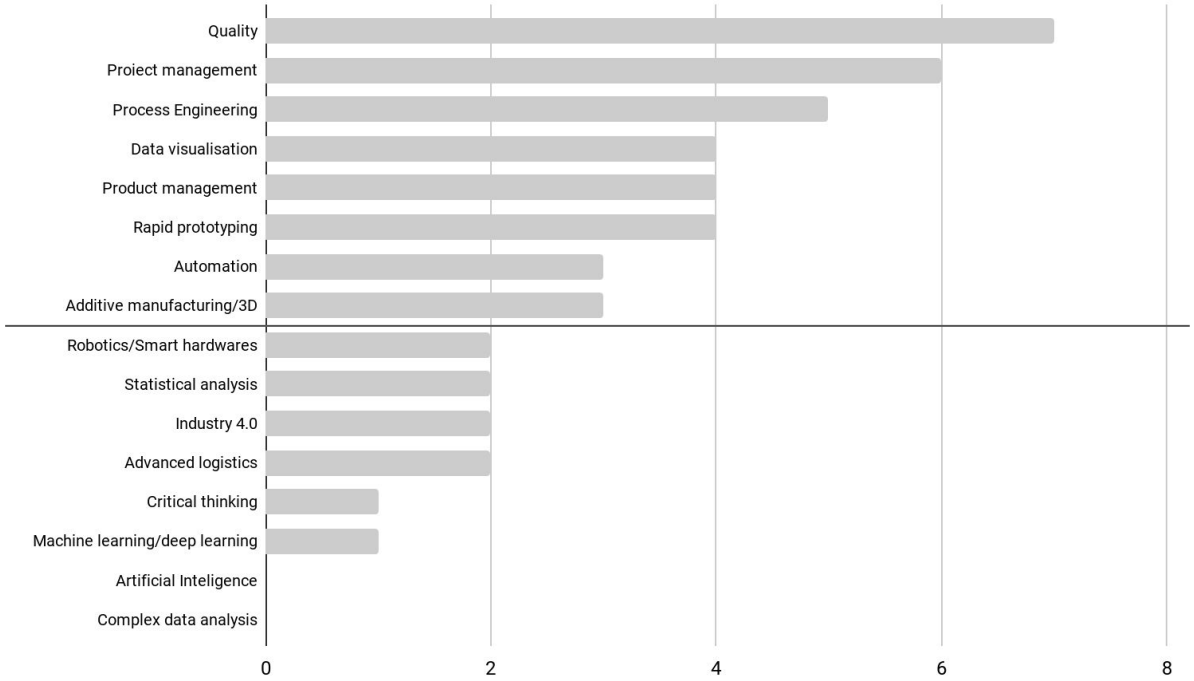
Technological competences



Do you have possibilities to train your employees in the competences mentioned above?

The upper part of the line shows the technological skills with a more accessible training offer for companies.

The units show the number of times a competence has been chosen by the participating companies.

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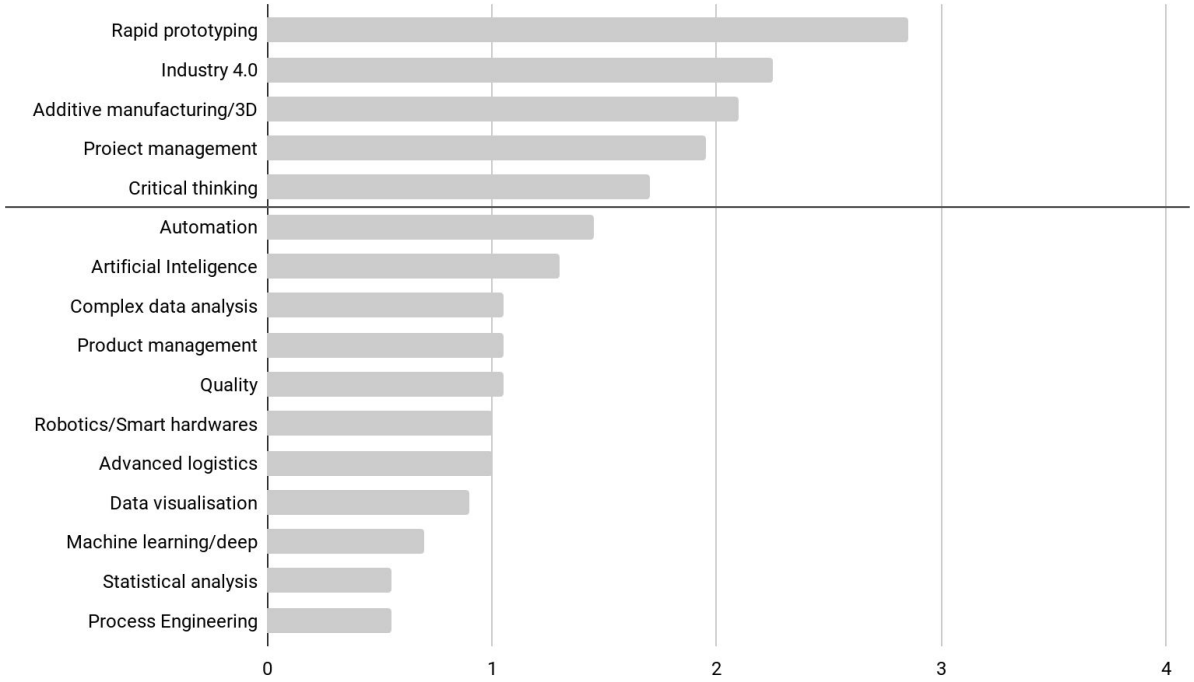
Technological competences



Select five of the following technological competences that you would like to improve in the near future through training.

The top of the line shows the 5 technological skills that companies would like to improve in the short term through training, where 0 = not a priority and 4 = high priority.

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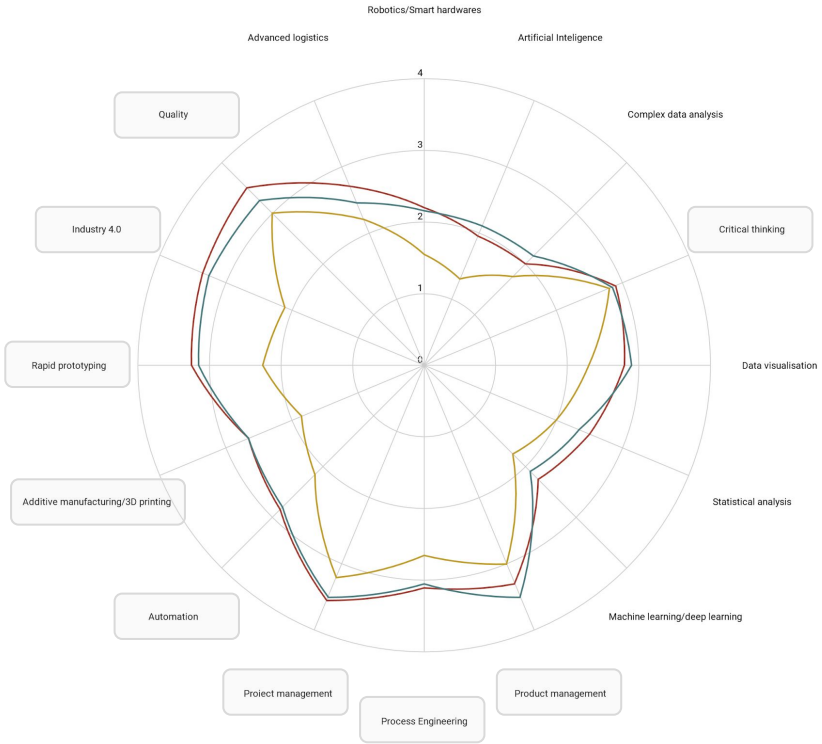
Technological competences



Importance
Strength
Commitment to improve

Priority technological competences are the following:

Industry 4.0
Rapid prototyping
Project management
Product management
Quality
Process Engineering
Automation
Additive manufacturing / 3D printing
Critical thinking

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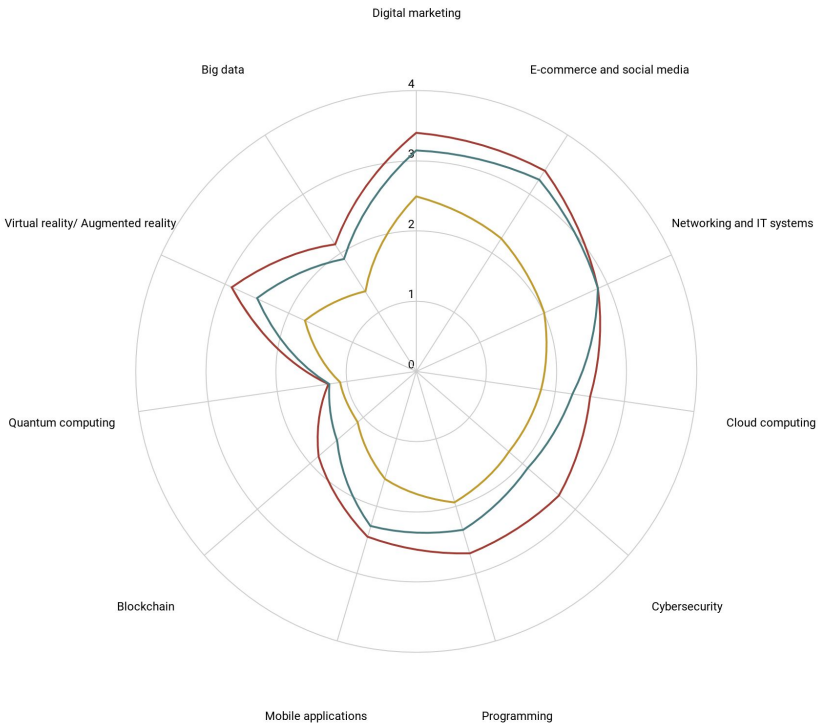
Digital competences



Importance
Strength
Commitment to improve

This graphic shows the average score of the "importance", "strength" and "commitment to improve" of the digital competencies for the interviewed companies, being 0 = not important and 4 = very important.

Digital competences

IMPORTANCE	WEAKNESS	COMMITMENT TO IMPROVE
Digital marketing	**Blockchain**	**E-commerce and social media**
E-commerce and social media	**Quantum computing**	**Digital marketing**
Virtual reality/ Augmented reality	**Big data**	Networking and IT systems
Networking and IT systems	**Mobile applications**	Virtual reality/ Augmented reality
Cybersecurity	**Cybersecurity**	Programming
Programming	**Virtual reality/ Augmented reality**	Mobile applications
Cloud computing	**Cloud computing**	Cloud computing
Mobile applications	**Programming**	Cybersecurity
Big data	**Networking and IT systems**	Big data
Blockchain	E-commerce and social media	Blockchain
Quantum computing	Digital marketing	Quantum computing

Importance (+ to –)
Weakness (- to +)
Commitment to improve (+ to –)

The first column shows the digital competencies in descending order according to their score in "importance". Those competencies with an average score of 3 or more are shown in bold.

The third column shows the same type of analysis for the criterion "commitment to improve".

In contrast, the second column shows the digital competencies in ascending order according to their "weakness", as opposed to the criterion "strength" presented in the graphic of the previous slide. Those competencies with an average score of 2 or less are shown in bold.

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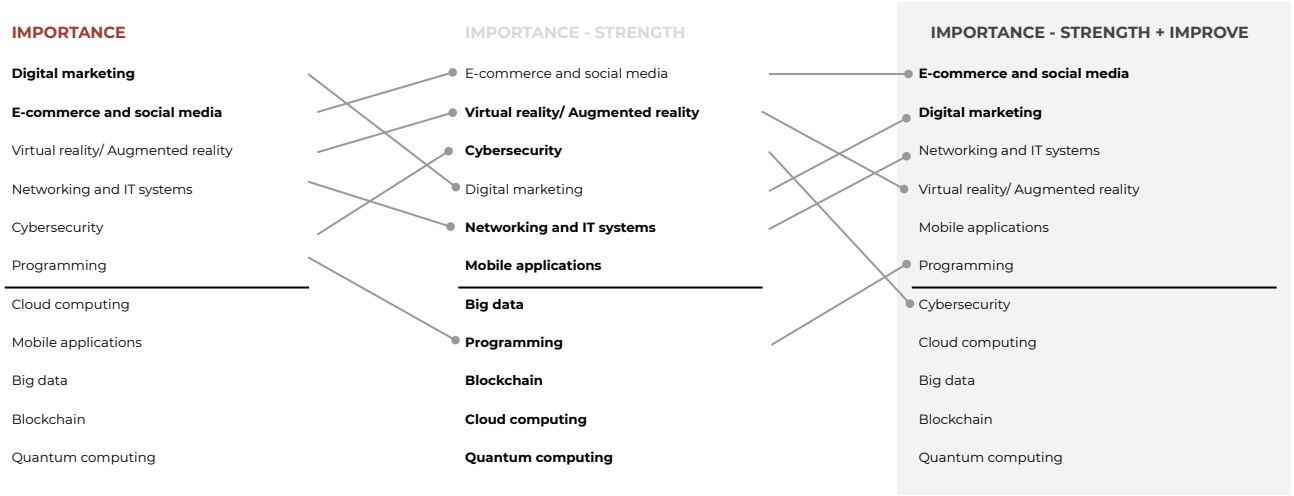
Digital competences



Importance
Should be trained in
Conclusion

The first column shows the digital competences in descending order according to their score in "IMPORTANCE".

The second column shows the competencies in descending order according to their score in IMPORTANCE - STRENGTH.

And finally, the third column shows the competencies in descending order according to their score resulting from IMPORTANCE - STRENGTH + IMPROVE.

This third column shows the digital competencies in descending order of priority for the interviewed companies considering jointly the three evaluated criteria.
The arrows show the displacement of the competences that have obtained a higher score in IMPORTANCE (upper half).

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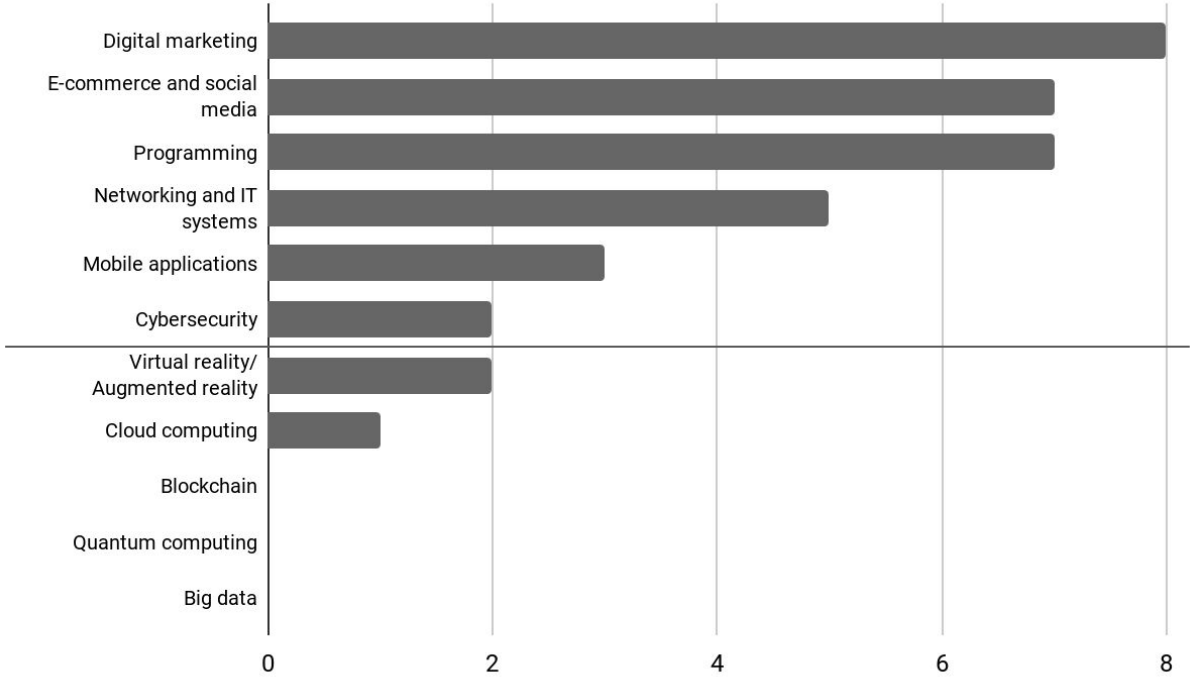
Digital competences



Do you have possibilities to train your employees in the competences mentioned above?

The upper part of the line shows the digital competences with a more accessible training offer for companies.

The units show the number of times a competence has been chosen by the participating companies.

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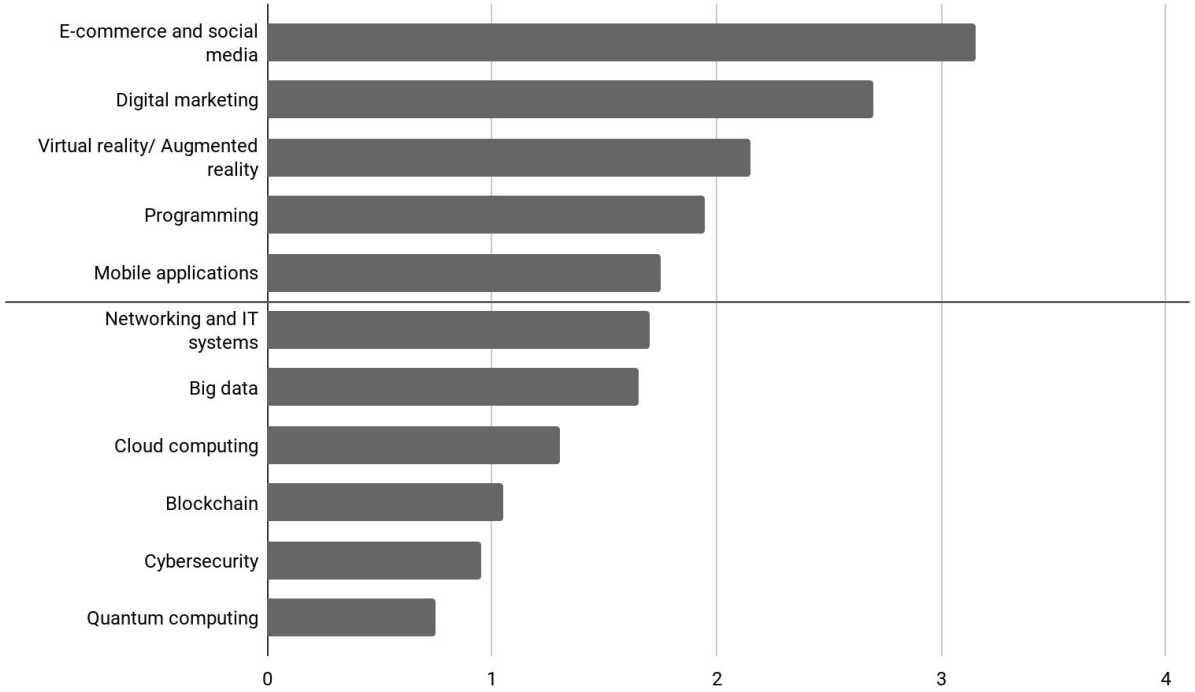
Digital competences



Select five of the following digital competences that you would like to improve in the near future through training.

The top of the line shows the 5 digital competences that companies would like to improve in the short term through training, where 0 = not a priority and 4 = high priority..

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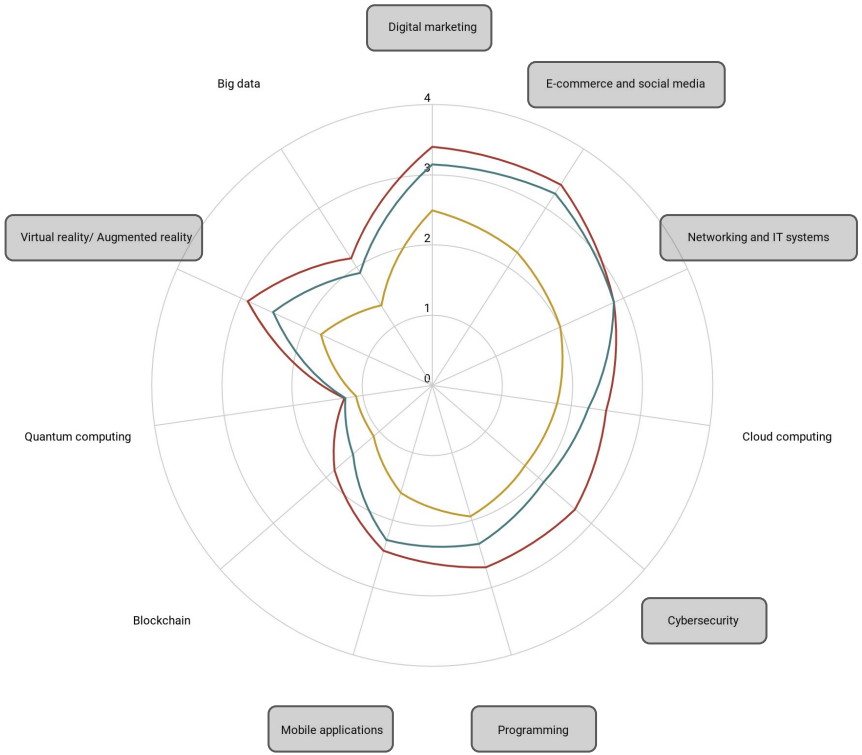
Digital competences



Importance
Strength
Commitment to improve

Priority digital competences are the following:

E-commerce and social media
Digital marketing
Networking and IT systems
Virtual reality / Augmented reality
Mobile applications
Programming
Cybersecurity

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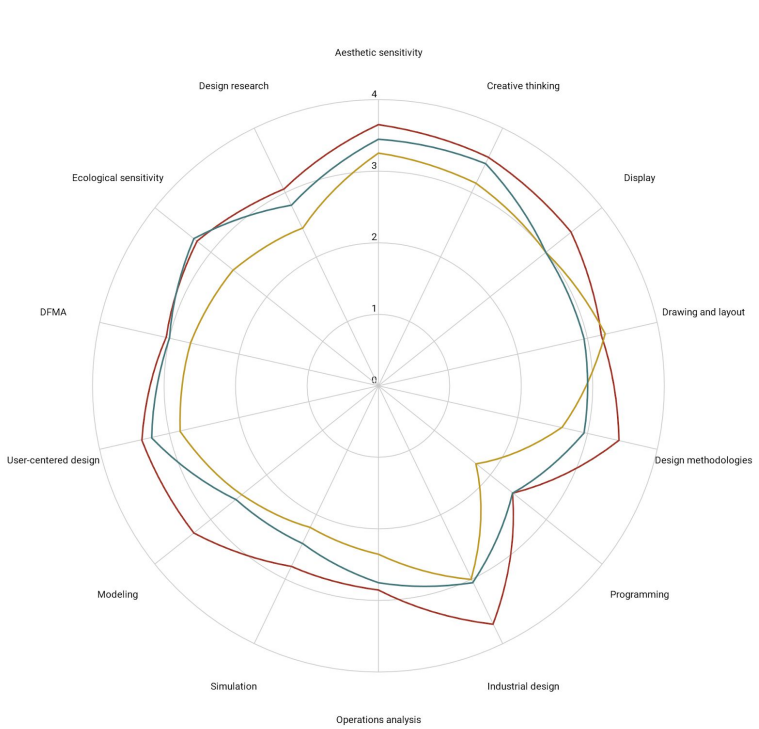
Design competences



Importance
Strength
Commitment to improve

This graphic shows the average score of the "importance", "strength" and "commitment to improve" of the design competencies for the interviewed companies, being 0 = not important and 4 = very important.

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Design competences

IMPORTANCE	WEAKNESS	COMMITMENT TO IMPROVE
Industrial design	**Programming**	**Aesthetic sensitivity**
Aesthetic sensitivity	Simulation	**Creative thinking**
Creative thinking	Operations analysis	**Ecological sensitivity**
Display	Modeling	**User-centered design**
Design methodologies	Design research	**Industrial design**
User-centered design	Ecological sensitivity	**Display**
Modeling	Design methodologies	**DFMA**
Ecological sensitivity	DFMA	Drawing and layout
Drawing and layout	User-centered design	Design methodologies
DFMA	Display	Design research
Design research	Industrial design	Operations analysis
Operations analysis	Creative thinking	Modeling
Simulation	Aesthetic sensitivity	Simulation
Programming	Drawing and layout	Programming

Importance (+ to –)
Weakness (- to +)
Commitment to improve (+ to –)

The first column shows the design competencies in descending order according to their score in "importance". Those competencies with an average score of 3 or more are shown in bold.

The third column shows the same type of analysis for the criterion "commitment to improve".

In contrast, the second column shows the design competencies in ascending order according to their "weakness", as opposed to the criterion "strength" presented in the graphic of the previous slide. Those competencies with an average score of 2 or less are shown in bold.

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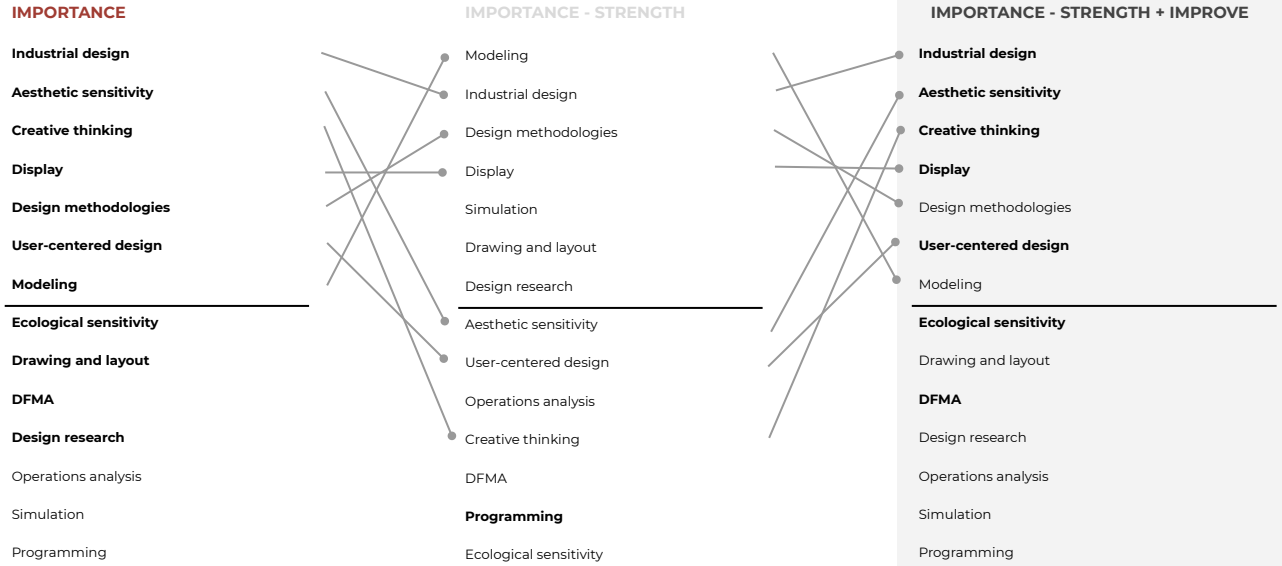
Design competences



- *Importance*
- *Should be trained in*
- *Conclusion*

The first column shows the design competences in descending order according to their score in "IMPORTANCE".

The second column shows the competencies in descending order according to their score in IMPORTANCE - STRENGTH.

And finally, the third column shows the competencies in descending order according to their score resulting from IMPORTANCE - STRENGTH + IMPROVE.

This third column shows the design competencies in descending order of priority for the interviewed companies considering jointly the three evaluated criteria.

The arrows show the displacement of the competences that have obtained a higher score in IMPORTANCE (upper half).

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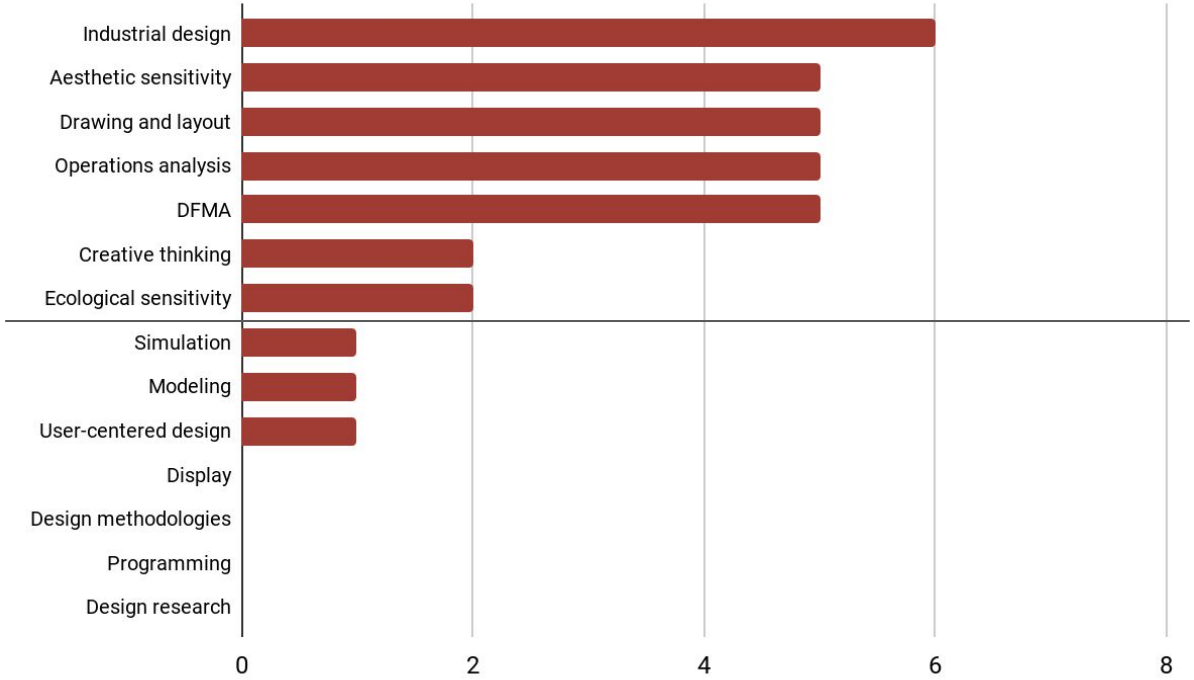
Design competences



Do you have possibilities to train your employees in the competences mentioned above?

The upper part of the line shows the design competences with a more accessible training offer for companies.

The units show the number of times a competence has been chosen by the participating companies.

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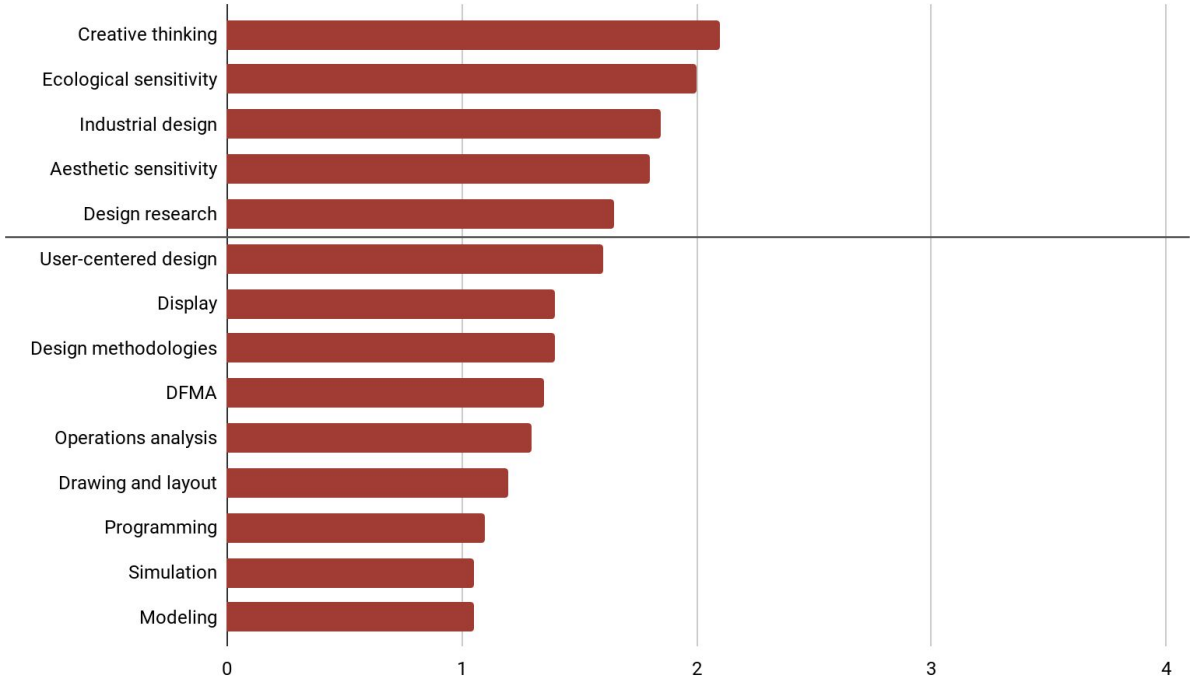
Design competences



Select five of the following design competences that you would like to improve in the near future through training.

The top of the line shows the 5 design competences that companies would like to improve in the short term through training, where 0 = not a priority and 4 = high priority..

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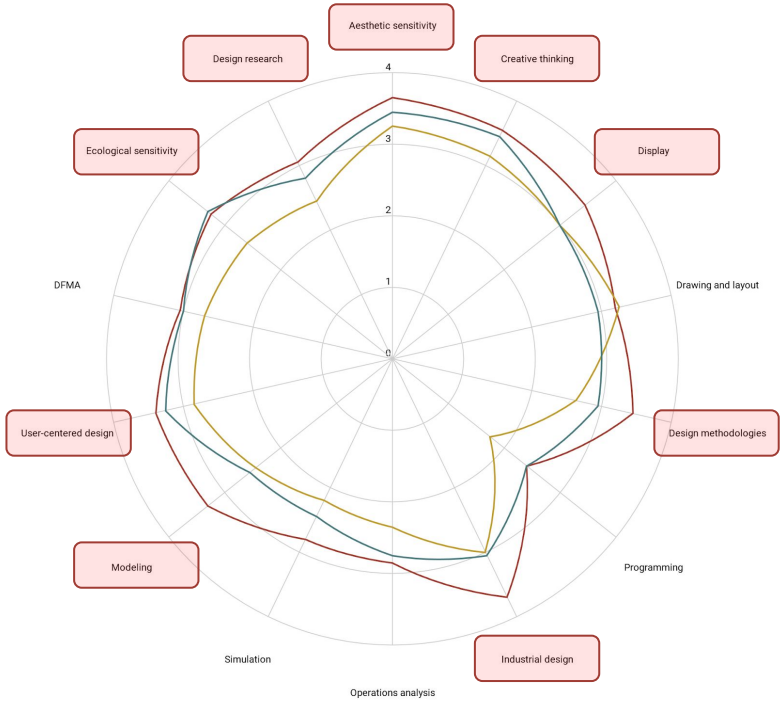
Design competences



Importance
Strength
Commitment to improve

Priority design competences are the following:

Industrial design
Aesthetic sensitivity
Creative thinking
Display
Design methodologies
User-centered design
Modeling
Ecological sensitivity
Design research

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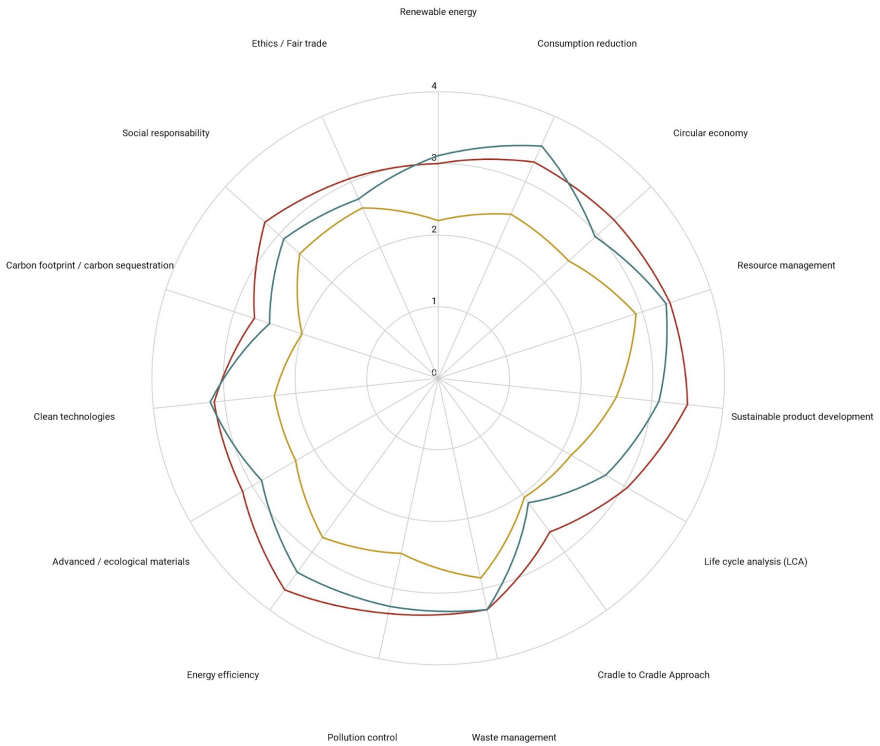
Green competences



Importance
Strength
Commitment to improve

This graphic shows the average score of the "importance", "strength" and "commitment to improve" of the green competencies for the interviewed companies, being 0 = not important and 4 = very important..

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Green competences

IMPORTANCE	WEAKNESS	COMMITMENT TO IMPROVE
Energy efficiency	**Carbon footprint / carbon sequestration**	**Consumption reduction**
Sustainable product development	Cradle to Cradle Approach	**Resource management**
Resource management	Life cycle analysis (LCA)	**Energy efficiency**
Pollution control	Renewable energy	**Waste management**
Consumption reduction	Advanced / ecological materials	**Pollution control**
Circular economy	Clean technologies	**Clean technologies**
Waste management	Circular economy	**Renewable energy**
Social responsibility	Consumption reduction	**Sustainable product development**
Advanced / ecological materials	Sustainable product development	Circular economy
Clean technologies	Pollution control	Social responsibility
Life cycle analysis (LCA)	Social responsibility	Advanced / ecological materials
Ethics / Fair trade	Ethics / Fair trade	Ethics / Fair trade
Renewable energy	Energy efficiency	Life cycle analysis (LCA)
Carbon footprint / carbon sequestration	Waste management	Carbon footprint / carbon sequestration
Cradle to Cradle Approach	Resource management	Cradle to Cradle Approach

Importance (+ to –)
Weakness (- to +)
Commitment to improve (+ to –)

The first column shows the green competencies in descending order according to their score in "importance". Those competencies with an average score of 3 or more are shown in bold.

The third column shows the same type of analysis for the criterion "commitment to improve".

In contrast, the second column shows the green competencies in ascending order according to their "weakness", as opposed to the criterion "strength" presented in the graphic of the previous slide. Those competencies with an average score of 2 or less are shown in bold.

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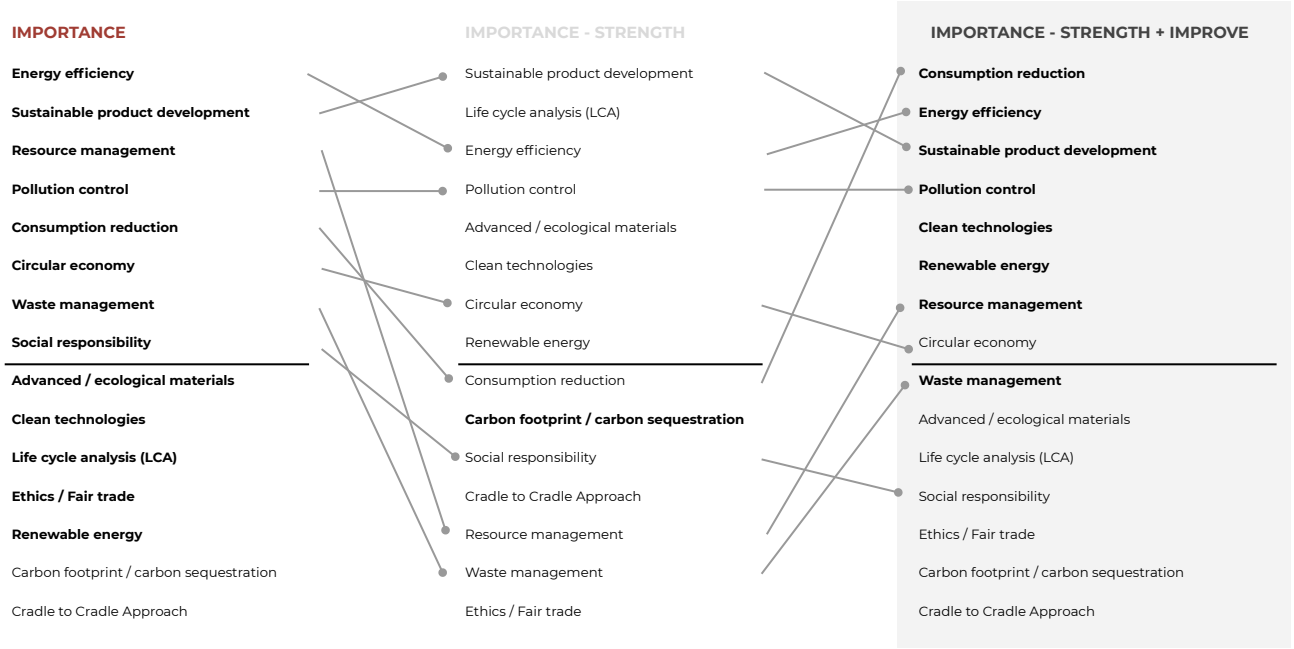
Green competences



Importance
Should be trained in
Conclusion

The first column shows the green competences in descending order according to their score in "IMPORTANCE".

The second column shows the competencies in descending order according to their score in IMPORTANCE - STRENGTH.

And finally, the third column shows the competencies in descending order according to their score resulting from IMPORTANCE - STRENGTH + IMPROVE.

This third column shows the green competencies in descending order of priority for the interviewed companies considering jointly the three evaluated criteria.

The arrows show the displacement of the competences that have obtained a higher score in IMPORTANCE (upper half).

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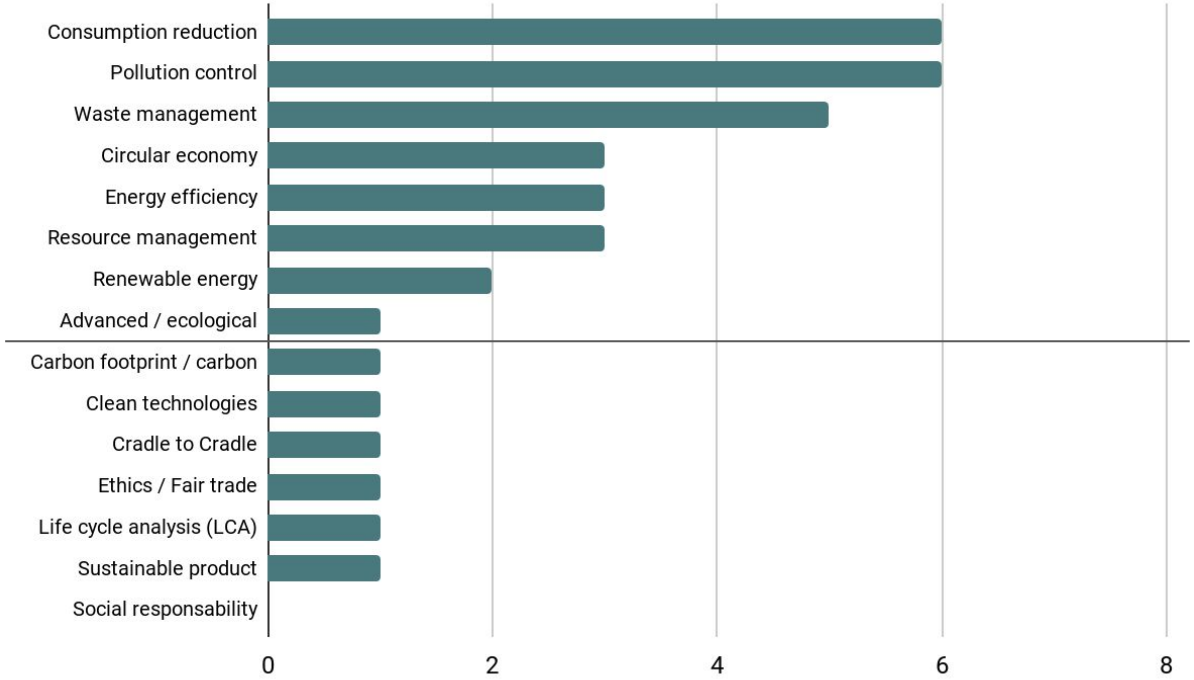
Green competences



Do you have possibilities to train your employees in the competences mentioned above?

The upper part of the line shows the green competences with a more accessible training offer for companies.

The units show the number of times a competence has been chosen by the participating companies.

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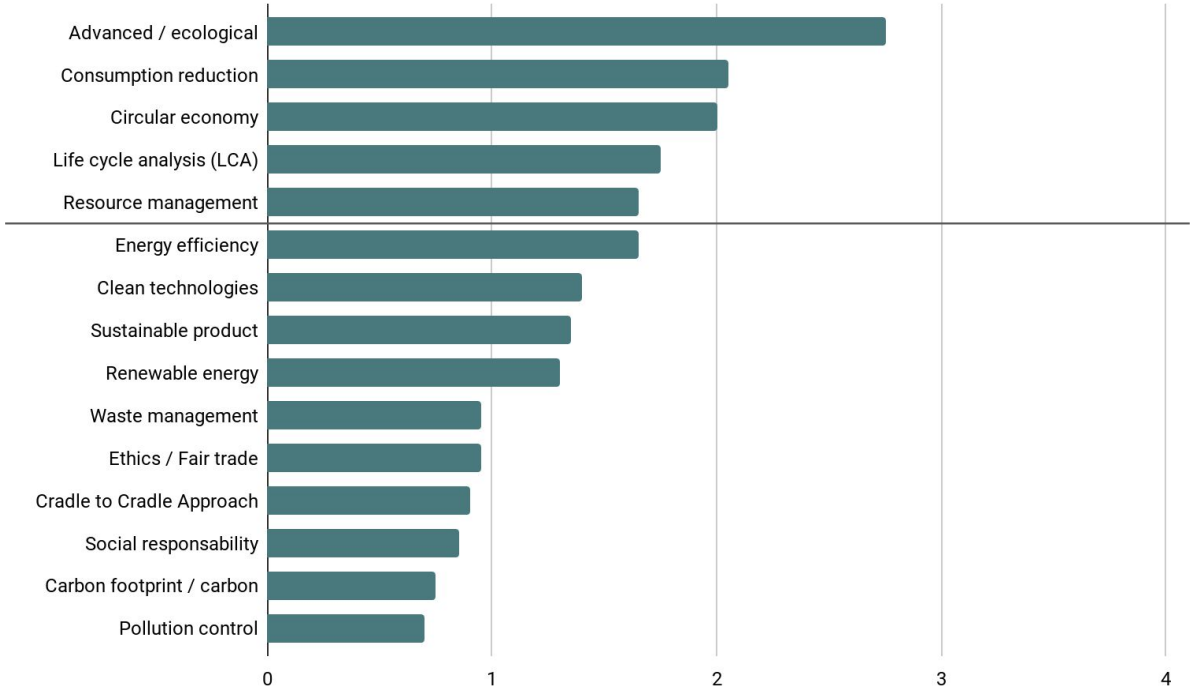
Green competences



Select five of the following green competences that you would like to improve in the near future through training.

The top of the line shows the 5 green competences that companies would like to improve in the short term through training, where 0 = not a priority and 4 = high priority..

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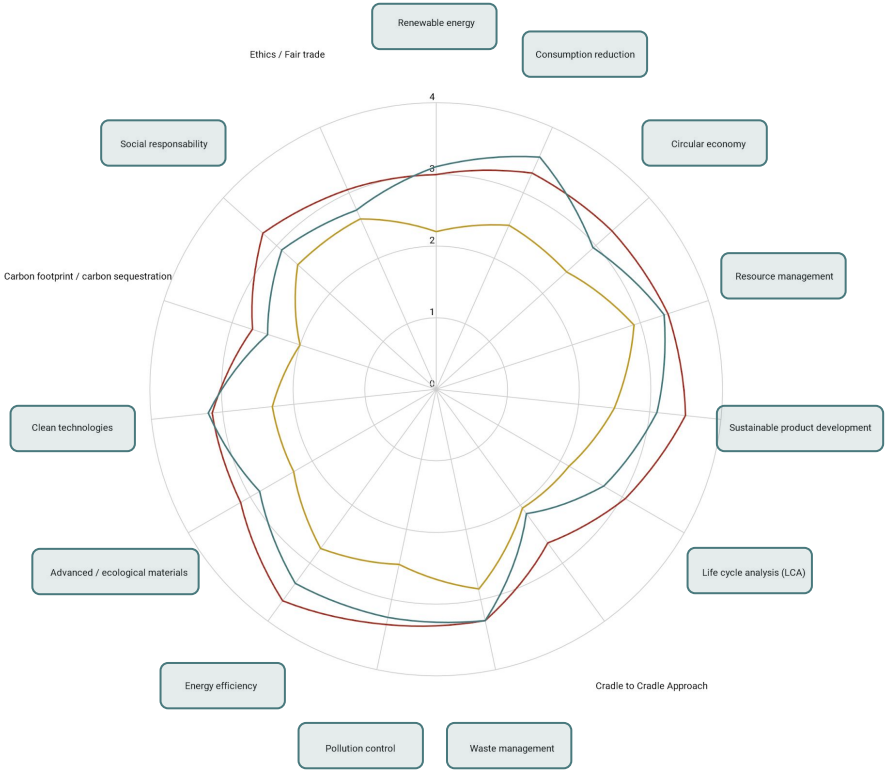
LEITAT managing technologies

Green competences



Importance
Strength
Commitment to improve

Priority green competences are the following:

Consumption reduction
Energy efficiency
Sustainable product development
Pollution control
Clean technologies
Renewable energy
Resource management
Circular economy
Waste management
Social responsibility
Advanced / ecological materials
Life cycle analysis (LCA)

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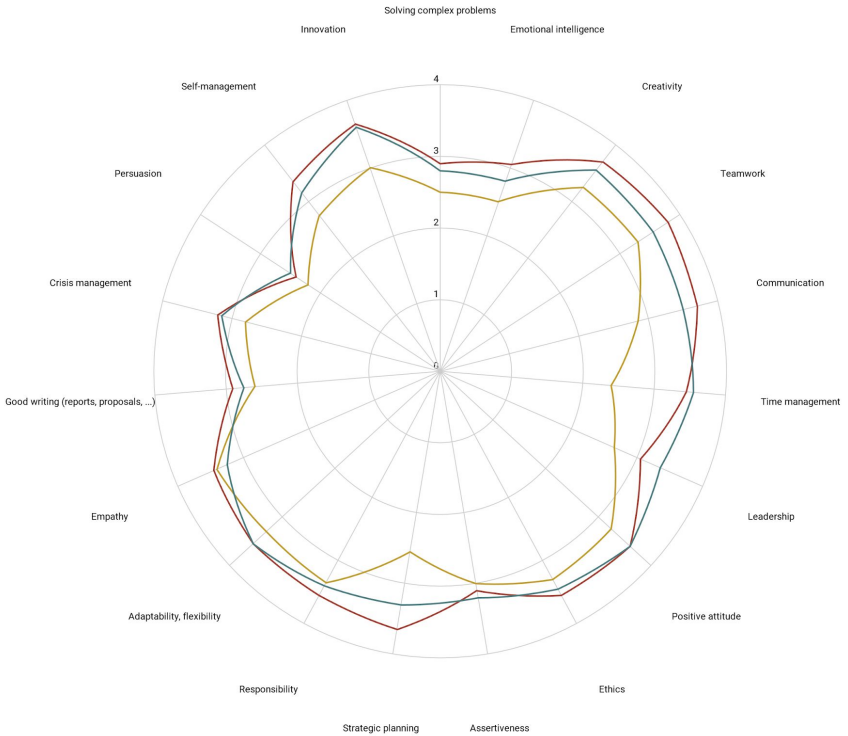
Soft competences



Importance
Strength
Commitment to improve

This graphic shows the average score of the "importance", "strength" and "commitment to improve" of the soft competencies for the interviewed companies, being 0 = not important and 4 = very important.

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Soft competences

IMPORTANCE	WEAKNESS	COMMITMENT TO IMPROVE
Teamwork	Persuasion	**Positive attitude**
Creativity	Time management	**Innovation**
Communication	Solving complex problems	**Creativity**
Strategic planning	Emotional intelligence	**Teamwork**
Innovation	Strategic planning	**Time management**
Positive attitude	Good writing (reports, proposals, ...)	**Adaptability, flexibility**
Ethics	Leadership	**Communication**
Responsibility	Self-management	**Ethics**
Adaptability, flexibility	Crisis management	**Responsibility**
Time management	Communication	**Leadership**
Empathy	Assertiveness	**Strategic planning**
Self-management	Innovation	**Empathy**
Crisis management	Creativity	**Assertiveness**
Assertiveness	Positive attitude	**Crisis management**
Emotional intelligence	Teamwork	**Self-management**
Leadership	Ethics	Solving complex problems
Solving complex problems	Adaptability, flexibility	Emotional intelligence
Good writing (reports, proposals, ...)	Responsibility	Good writing (reports, proposals, ...)
Persuasion	Empathy	Persuasion

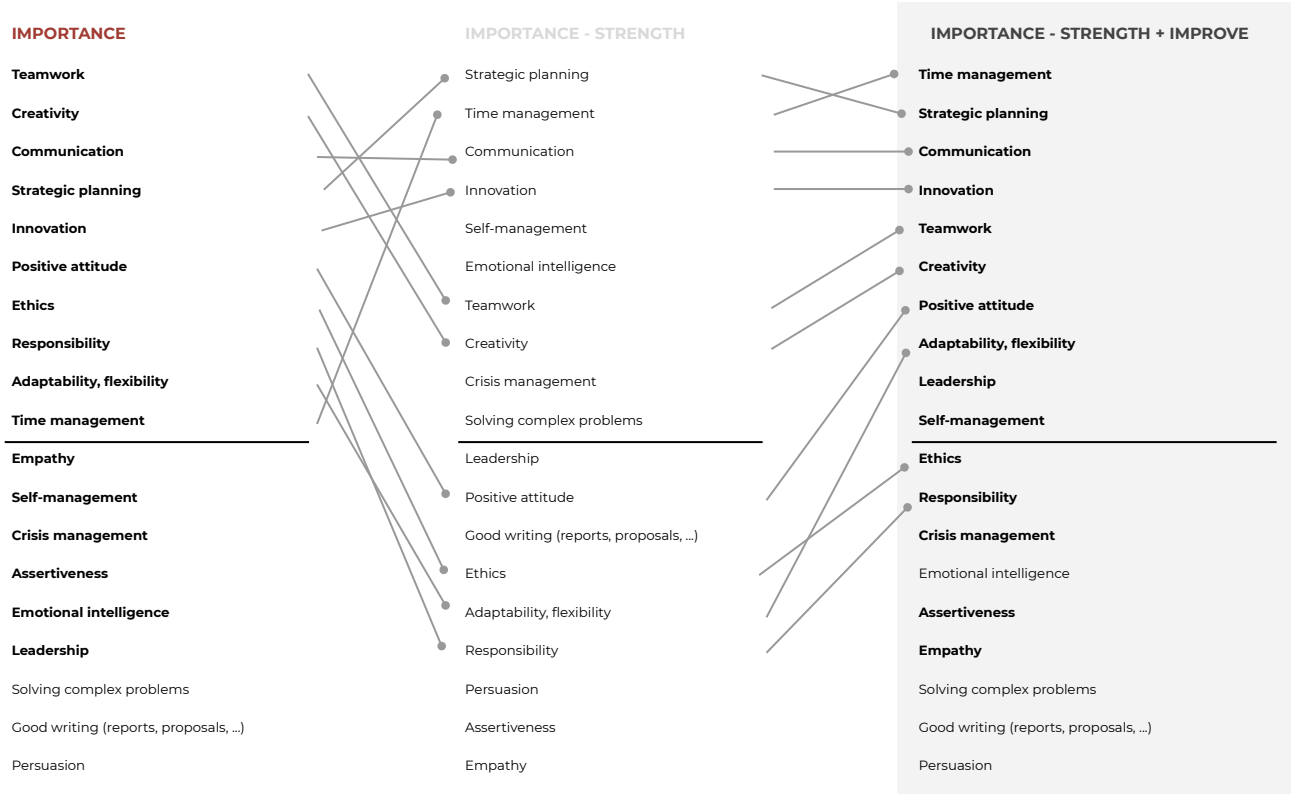
Importance (+ to –)
Weakness (- to +)
Commitment to improve (+ to –)

The first column shows the soft competencies in descending order according to their score in "importance". Those competencies with an average score of 3 or more are shown in bold.

The third column shows the same type of analysis for the criterion "commitment to improve".

In contrast, the second column shows the soft competencies in ascending order according to their "weakness", as opposed to the criterion "strength" presented in the graphic of the previous slide. Those competencies with an average score of 2 or less are shown in bold.

Soft competences



Importance
Should be trained in
Conclusion

The first column shows the soft competences in descending order according to their score in "IMPORTANCE".

The second column shows the competencies in descending order according to their score in IMPORTANCE - STRENGTH.

And finally, the third column shows the competencies in descending order according to their score resulting from IMPORTANCE - STRENGTH + IMPROVE.

This third column shows the soft competencies in descending order of priority for the interviewed companies considering jointly the three evaluated criteria.

The arrows show the displacement of the competences that have obtained a higher score in IMPORTANCE (upper half).

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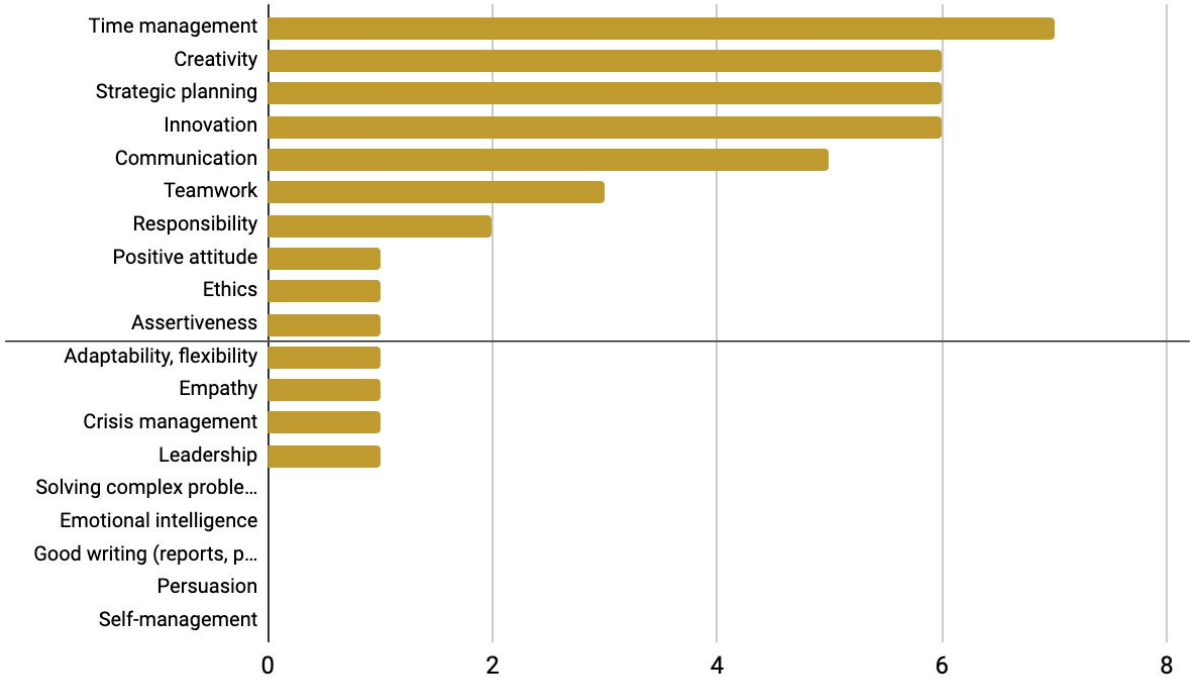
Soft competences



Do you have possibilities to train your employees in the competences mentioned above?

The upper part of the line shows the soft competences with a more accessible training offer for companies.

The units show the number of times a competence has been chosen by the participating companies.

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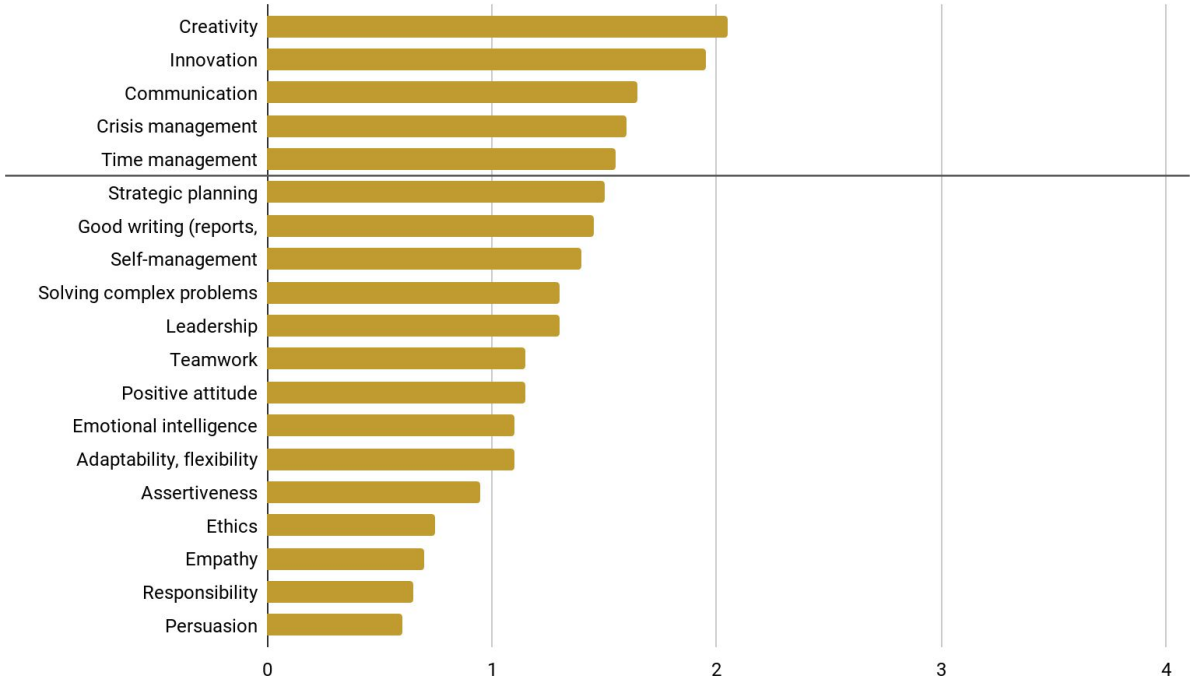
Soft competences



Select five of the following soft competences that you would like to improve in the near future through training.

The top of the line shows the 5 soft competences that companies would like to improve in the short term through training, where 0 = not a priority and 4 = high priority..

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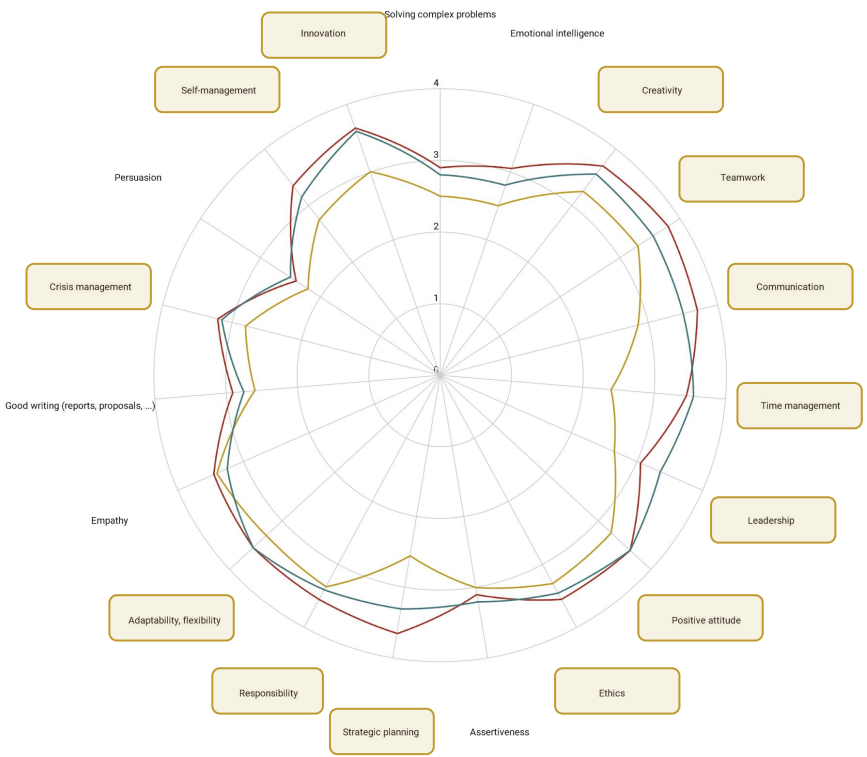
Soft competences



Importance
Strength
Commitment to improve

Priority soft competences are the following:

Time management
Strategic planning
Communication
Innovation
Teamwork
Creativity
Positive attitude
Adaptability, flexibility
Leadership
Self-management
Ethics
Responsibility
Crisis management

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Other competences

- CRM
- ERP
- Digital Modelling
- Rendered
- Corporate Innovation
- Environmental analysis
- Agile and parametric programming systems
- Systematization of transition to sustainable economies and processes
- New sustainable materials related to digital and artisanal manufacturing, and in my case biotechnology related to the mimesis of nature.
- Communication and leadership of multidisciplinary teams, helping the transition from a hierarchical to a matrix organization.
- Ethics in ICT
- Strategic vision
- Viewing
- Design thinking
- Parametric programming
- Mastery of the tools to place the user and the environment at the centre of a design project
- Mastering the processes and methods of data collection for research for and through design
- Mastery of digital volume representation tools for representation and manufacturing
- Mastery of industrial production processes. Traditional, innovative, local and international processes
- Value for the impact and knowledge of the circular economy.
- Human relations and the sensitivity to listen and understand people. Value for the field of humanities.
- Design research
- Product Life Cycle Analysis using software tools such as Sima-Pro
- Biomimetics
- Tools for the knowledge of processes focused on circular economy
- Value for generating design and services proposals with an ethical approach and based on social impact
- Data visualization and life cycle analysis of products and services. Permanency situations.
- Promotion of renewable energies implementation in the design process.
- Mastery of the tools for creative positioning. Breaking the established models
- Promoting the experiences of multidisciplinary teams linked to the design process
- Ability to understand Wicked Problems as systemic elements
- Value for narrative and reporting from a design standpoint
- Adaptability to change, management of contingencies and value of error as part of the design process. Uncertainty as a state.
- Negotiation techniques and related psychology.

Do you want to add any other competences that you think is important?

List of other competences that respondents consider relevant for the content of the Master to be developed.

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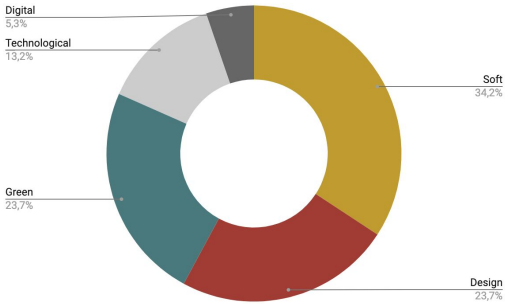
Global competences

intride

IMPORTANCE

Teamwork	**Empathy**	**Clean technologies**	Advanced logistics
Industrial design	Digital marketing	Process Engineering	Cybersecurity
Creativity	**E-commerce and social media**	**Assertiveness**	Programming
Communication	**User-centered design**	**DFMA**	Carbon footprint / carbon sequestration
Aesthetic sensitivity	**Resource management**	**Design research**	Additive manufacturing/3D printing
Energy efficiency	Industry 4.0	**Life cycle analysis (LCA)**	Cradle to Cradle Approach
Strategic planning	**Pollution control**	**Ethics / Fair trade**	Statistical analysis
Innovation	**Self-management**	**Emotional intelligence**	Cloud computing
Positive attitude	Product management	**Leadership**	Mobile applications
Proiect management	**Modeling**	**Renewable energy**	Programming
Creative thinking	**Consumption reduction**	Critical thinking	Persuasion
Ethics	**Circular economy**	Virtual reality/ Augmented reality	Machine learning/deep learning
Responsibility	**Waste management**	Solving complex problems	Robotics/Smart hardwares
Adaptability, flexibility	Rapid prototyping	Good writing (reports, proposals, ...)	Big data
Quality	**Ecological sensitivity**	Automation	Complex data analysis
Sustainable product development	**Social responsibility**	Networking and IT systems	Artificial Intelligence
Display	**Drawing and layout**	Operations analysis	Blockchain
Design methodologies	**Crisis management**	Data visualisation	Quantum computing
Time management	**Advanced / ecological materials**	Simulation	



This list shows the global competencies in descending order according to their score in "importance". Those competencies with an average score of 3 or more are shown in bold.

The graphic shows the proportion of competencies in the first half of the list - the first two columns - that belong to each competency category.

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CENFIM Furnishings Cluster ELISAVA LEITAT managing technologies

Global competences

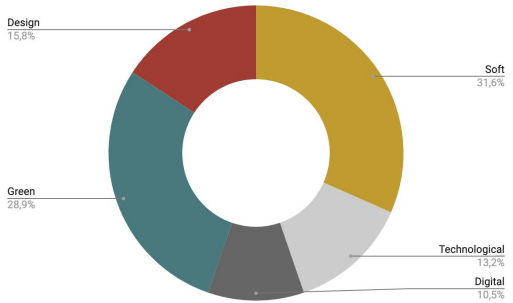
IMPORTANCE - STRENGTH + COMMITMENT TO IMPROVE

Time management
Industry 4.0
E-commerce and social media
Strategic planning
Consumption reduction
Communication
Energy efficiency
Innovation
Rapid prototyping
Sustainable product development
Pollution control
Clean technologies
Digital marketing
Teamwork
Creativity
Positive attitude
Ecological sensitivity
Renewable energy
Aesthetic sensitivity

Creative thinking
Resource management
Proiect management
Product management
User-centered design
Circular economy
Adaptability, flexibility
Design methodologies
Quality
Industrial design
Leadership
Self-management
Waste management
Networking and IT systems
Advanced / ecological materials
Ethics
Virtual reality/ Augmented reality
Life cycle analysis (LCA)
Responsibility

Crisis management
Social responsibility
Process Engineering
Automation
Display
Additive manufacturing/3D printing
Data visualisation
Modeling
Design research
DFMA
Emotional intelligence
Assertiveness
Empathy
Operations analysis
Solving complex problems
Ethics / Fair trade
Carbon footprint / carbon sequestration
Mobile applications
Programming

Cybersecurity
Programming
Simulation
Good writing (reports, proposals, ...)
Advanced logistics
Cloud computing
Critical thinking
Drawing and layout
Statistical analysis
Robotics/Smart hardwares
Artificial Intelligence
Cradle to Cradle Approach
Big data
Persuasion
Machine learning/deep learning
Complex data analysis
Blockchain
Quantum computing



This list shows the global competencies in descending order according to their score resulting from IMPORTANCE - STRENGTH + IMPROVE, thus considering together the three criteria assessed.

The graphic shows the proportion of competencies in the first half of the list - the first two columns - that belong to each competency category.

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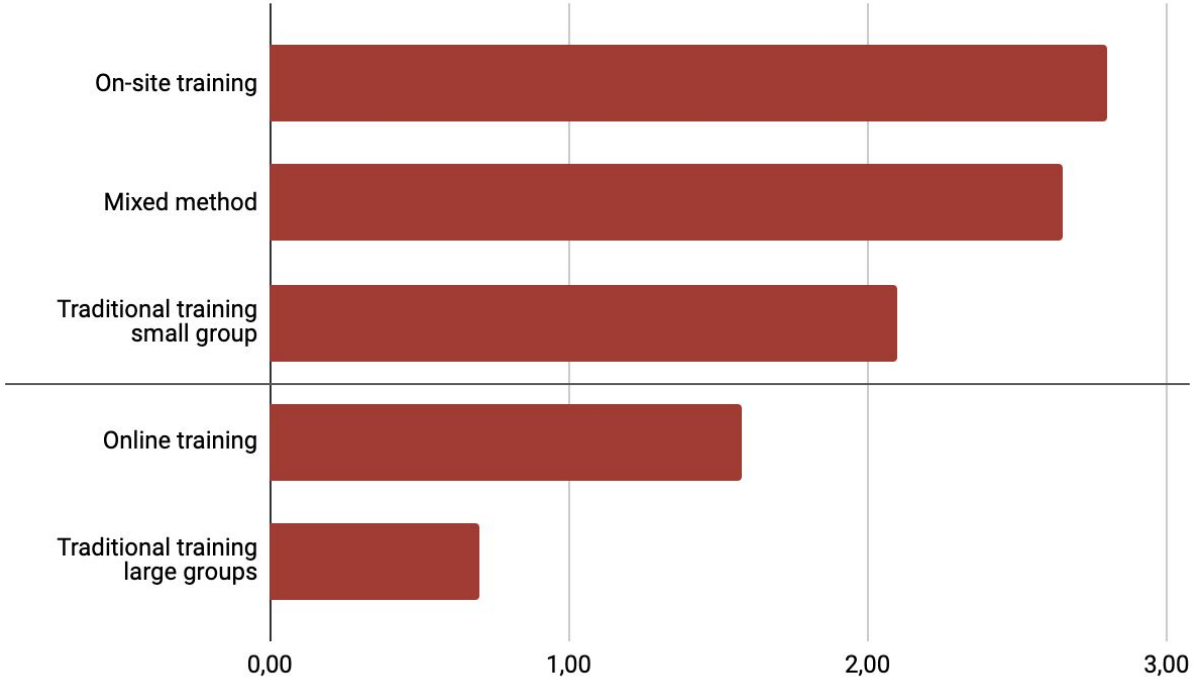
Training method

What training method do you prefer to train your employees in competences?



The top of the line shows the 3 training methods that companies prefer to train their employees, where 0 = not at all preferential and 4 = very preferential.

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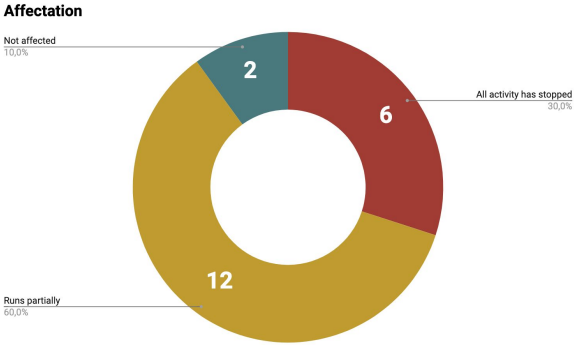
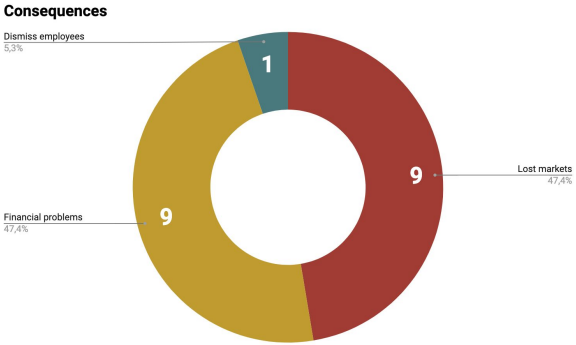
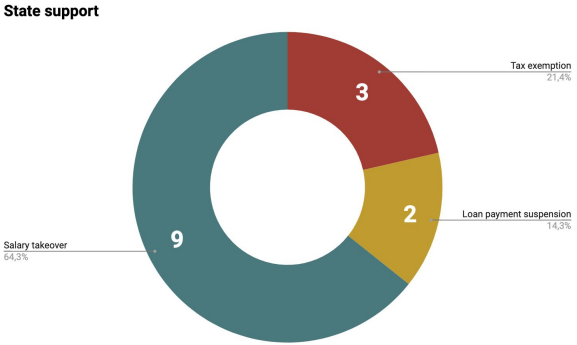
COVID situation







How the current situation (COVID-19) affects your business activities?

What are the consequences of the current situation on your business?

How the state supports your company in the current situation?

More than half of the companies have been affected by the coronavirus health crisis.

As a result they are mostly facing economic problems (47.5%) and have lost markets shares (47.5%).

The government has helped almost half of the companies by taking over their salaries.

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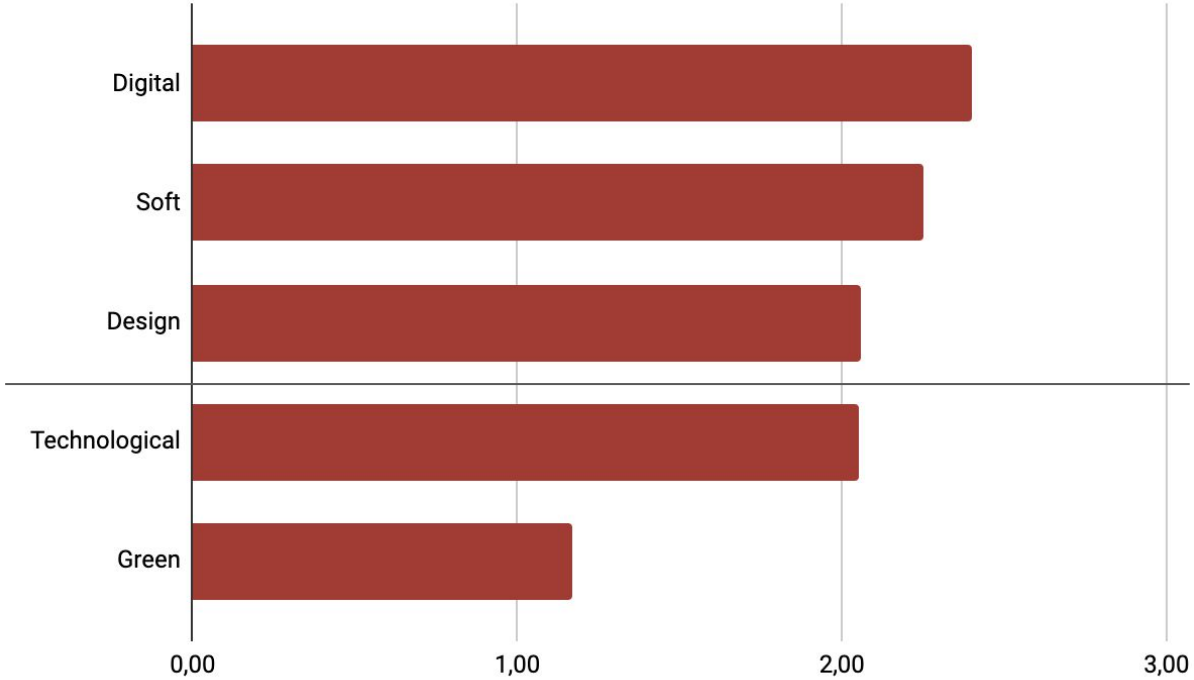
Post-COVID era key competences



What category of competences do you identify as a key competences to meet the challenges of the industry in the post-COVID-19 era?

The top of the line shows the 3 typologies of competences that companies identify as key competences to meet the challenges of the industry in the post-COVID-19 era, where 0 = not at all relevant and 4 = very relevant.

The Green competencies seem the least relevant in the post-COVID era19.

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Conclusions

The priority technological competences are the following:

Industry 4.0
Rapid prototyping
Project management
Product management
Quality
Process Engineering
Automation
Additive manufacturing / 3D printing
Critical thinking

You can find them at slide 18.

The priority digital competences are the following:

E-commerce and social media
Digital marketing
Networking and IT systems
Virtual reality / Augmented reality
Mobile applications
Programming
Cybersecurity

You can find them at slide 24.

The priority design competences are the following:

Industrial design
Aesthetic sensitivity
Creative thinking
Display
Design methodologies
User-centred design
Modelling
Ecological sensitivity
Design research

You can find them at slide 30.

The priority green competences are the following:

Consumption reduction
Energy efficiency
Sustainable product development
Pollution control
Clean technologies
Renewable energy
Resource management
Circular economy
Waste management
Social responsibility
Advanced / ecological materials
Life cycle analysis (LCA)

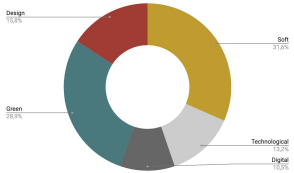
You can find them at slide 36.

The priority soft competences are the following:

Time management
Strategic planning
Communication
Innovation
Teamwork
Creativity
Positive attitude
Adaptability, flexibility
Leadership
Self-management
Ethics
Responsibility
Crisis management

You can find them at slide 42.

The relative priority of each competence to the total is shown on slide 45.



The graphic shows the proportion of competencies in the first half of the entire list (50% with the highest score) that belong to each competence category.

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Annex - Creative competences

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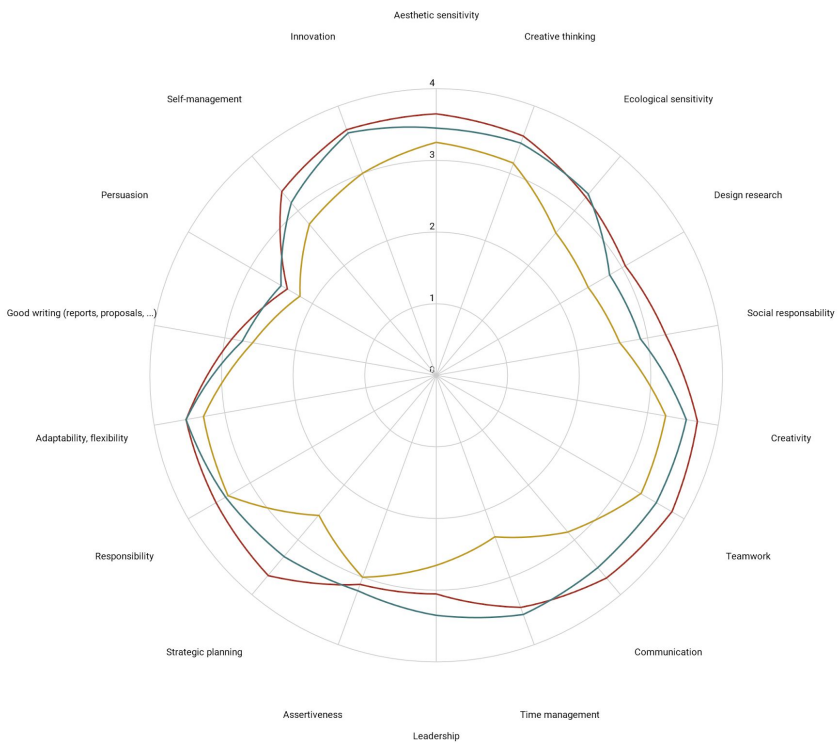
Creative competences



Importance
Strength
Commitment to improve

This graphic shows the average score of the "importance", "strength" and "commitment to improve" of the creative competencies for the interviewed companies, being 0 = not important and 4 = very important.

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Creative competences

IMPORTANCE	WEAKNESS	COMMITMENT TO IMPROVE
Teamwork	Persuasion	**Innovation**
Creativity	Time management	**Creativity**
Communication	Design research	**Teamwork**
Aesthetic sensitivity	Strategic planning	**Time management**
Strategic planning	Ecological sensitivity	**Adaptability, flexibility**
Innovation	Social responsibility	**Communication**
Creative thinking	Good writing (reports, proposals, ...)	**Aesthetic sensitivity**
Responsibility	Leadership	**Creative thinking**
Adaptability, flexibility	Self-management	**Responsibility**
Time management	Communication	**Leadership**
Self-management	Assertiveness	**Ecological sensitivity**
Ecological sensitivity	Innovation	**Strategic planning**
Social responsibility	Creative thinking	**Assertiveness**
Assertiveness	Aesthetic sensitivity	**Self-management**
Design research	Creativity	Social responsibility
Leadership	Teamwork	Design research
Good writing (reports, proposals, ...)	Adaptability, flexibility	Good writing (reports, proposals, ...)
Persuasion	Responsibility	Persuasion

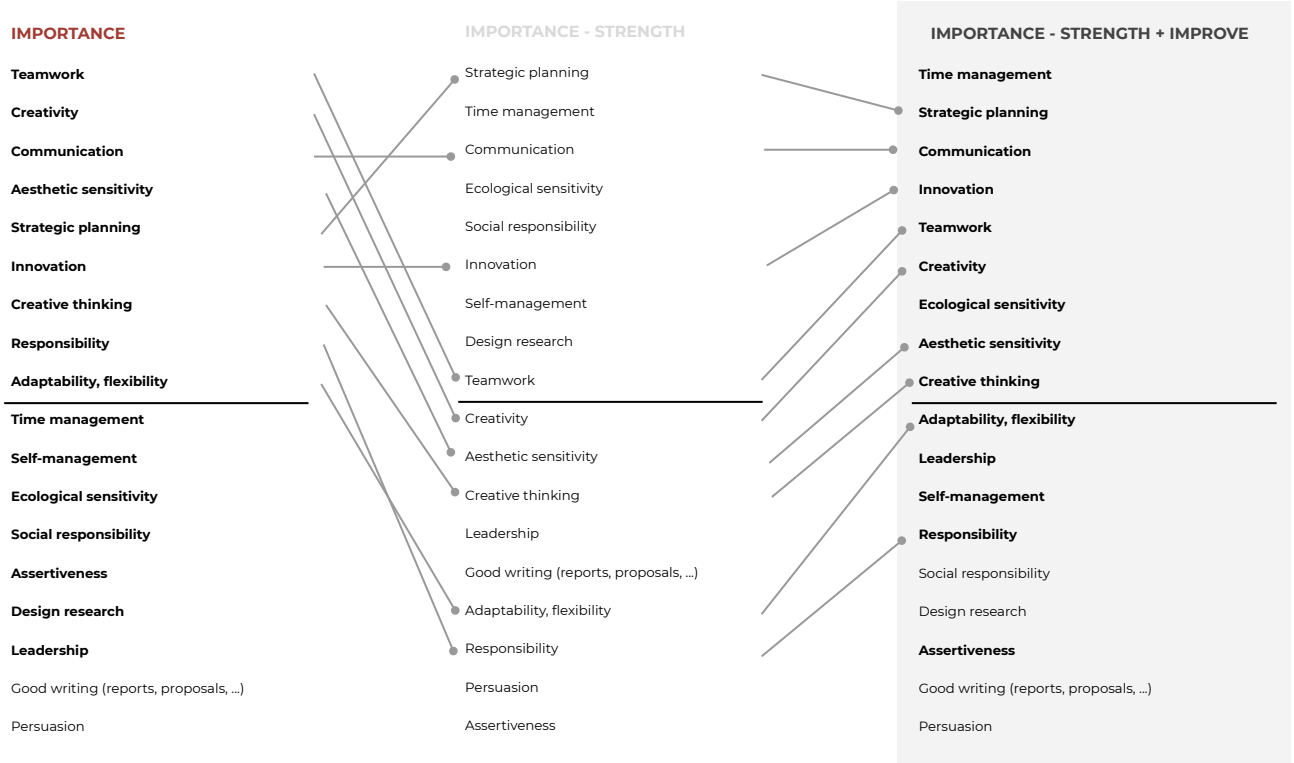
Importance (+ to –)
Weakness (- to +)
Commitment to improve (+ to –)

The first column shows the creative competencies in descending order according to their score in "importance". Those competencies with an average score of 3 or more are shown in bold.

The third column shows the same type of analysis for the criterion "commitment to improve".

In contrast, the second column shows the creative competencies in ascending order according to their "weakness", as opposed to the criterion "strength" presented in the graphic of the previous slide. Those competencies with an average score of 2 or less are shown in bold.

Creative competences



Importance
Should be trained in
Conclusion

The first column shows the creative competences in descending order according to their score in "IMPORTANCE".

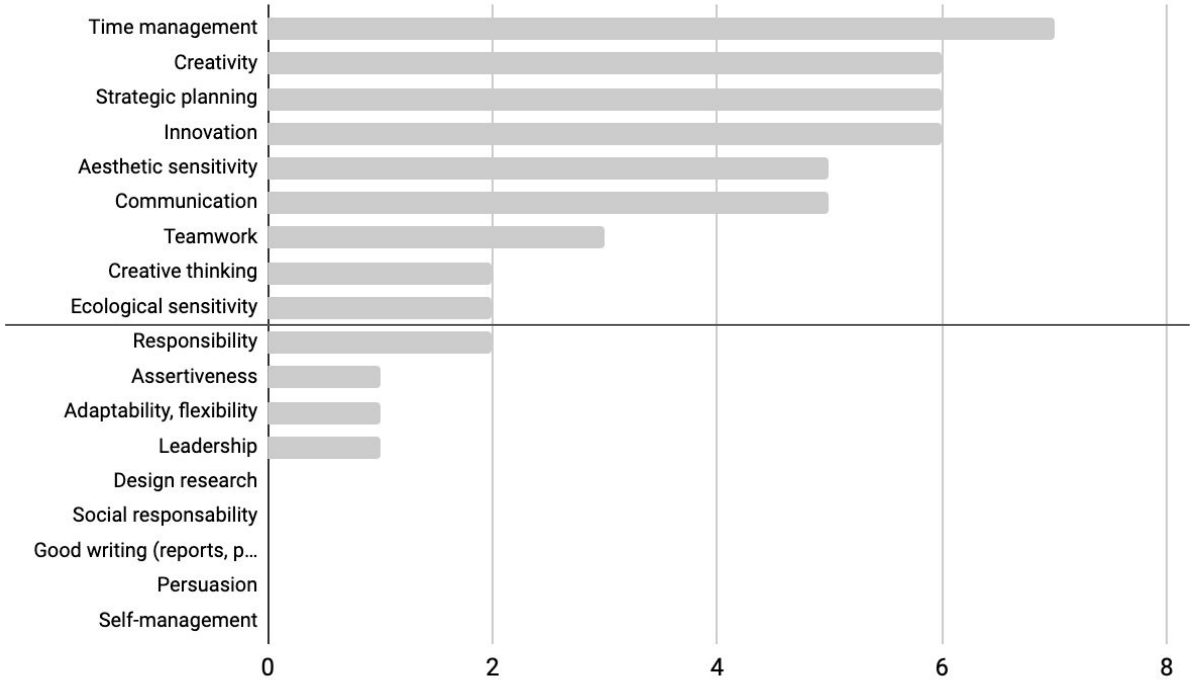
The second column shows the competencies in descending order according to their score in IMPORTANCE - STRENGTH.

And finally, the third column shows the competencies in descending order according to their score resulting from IMPORTANCE - STRENGTH + IMPROVE.

This third column shows the creative competencies in descending order of priority for the interviewed companies considering jointly the three evaluated criteria.

The arrows show the displacement of the competences that have obtained a higher score in IMPORTANCE (upper half).

Creative competences



Do you have possibilities to train your employees in the competences mentioned above?

The upper part of the line shows the creative competences with a more accessible training offer for companies.

The units show the number of times a competence has been chosen by the participating companies.

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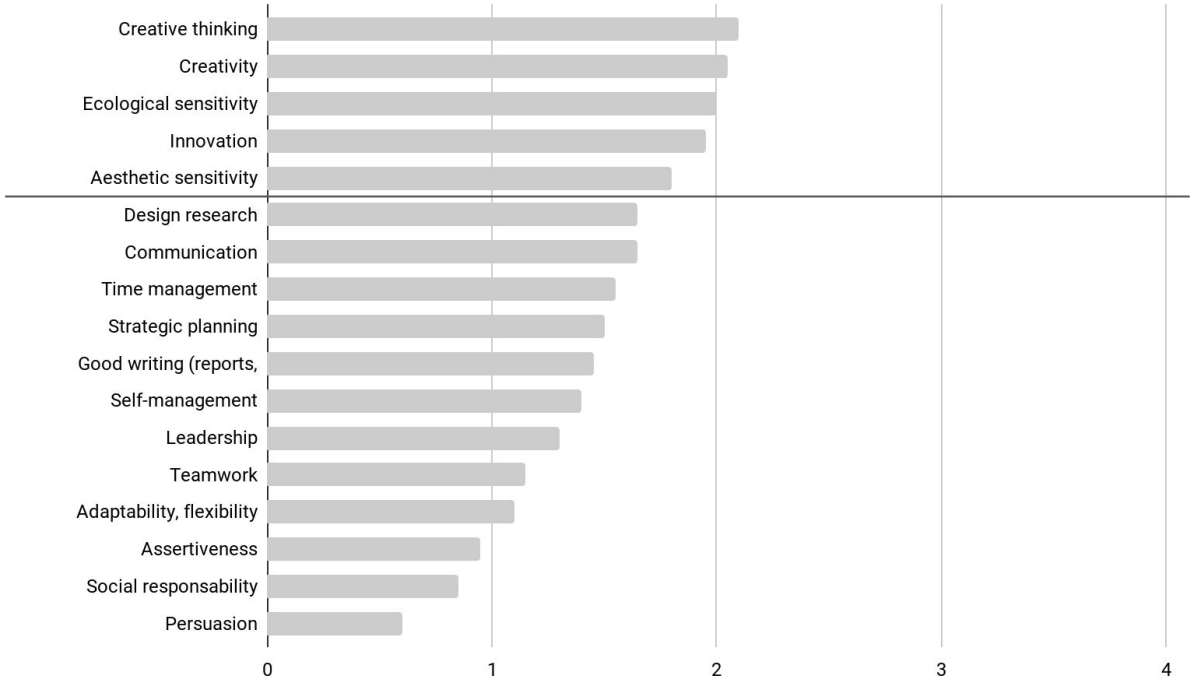
Creative competences



Select five of the following creative competences that you would like to improve in the near future through training.

The top of the line shows the 5 creative competences that companies would like to improve in the short term through training, where 0 = not a priority and 4 = high priority..

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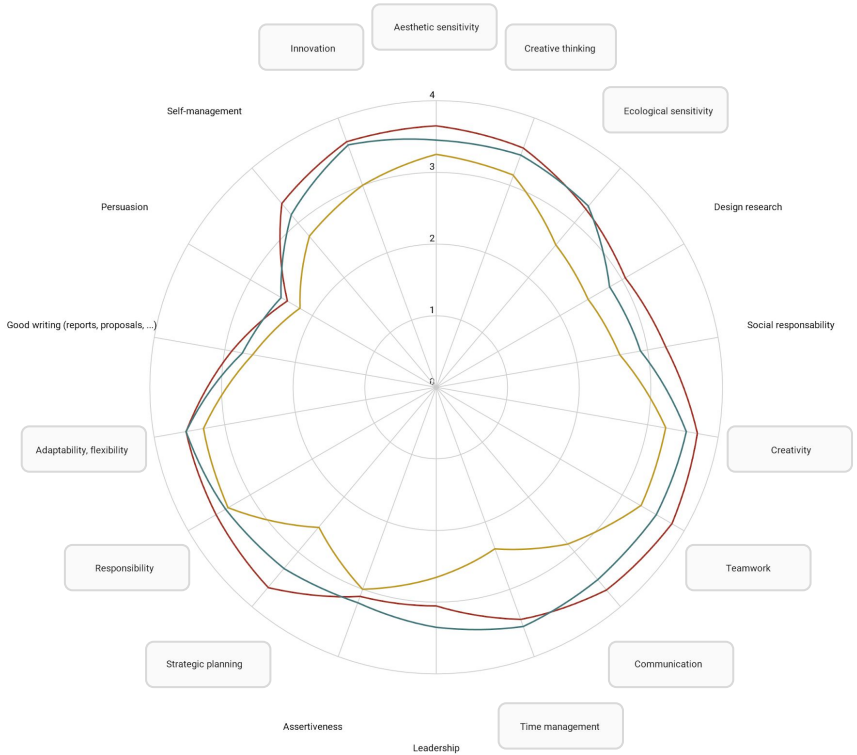
Creative competences



Importance
Strength
Commitment to improve

The selected competencies to be further developed in order of importance are the following:

Time management
Strategic planning
Communication
Innovation
Teamwork
Creativity
Ecological sensitivity
Aesthetic sensitivity
Creative thinking
Adaptability, flexibility
Responsibility

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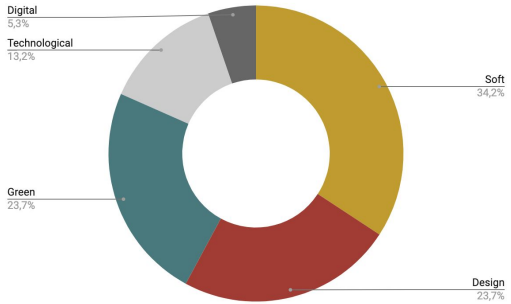
Global competences

IMPORTANCE

Teamwork	**Empathy**	**Clean technologies**	Advanced logistics
Industrial design	**Digital marketing**	Process Engineering	Cybersecurity
Creativity	**E-commerce and social media**	**Assertiveness**	Programming
Communication	**User-centered design**	**DFMA**	Carbon footprint / carbon sequestration
Aesthetic sensitivity	**Resource management**	**Design research**	Additive manufacturing/3D printing
Energy efficiency	Industry 4.0	**Life cycle analysis (LCA)**	Cradle to Cradle Approach
Strategic planning	**Pollution control**	**Ethics / Fair trade**	Statistical analysis
Innovation	**Self-management**	**Emotional intelligence**	Cloud computing
Positive attitude	Product management	**Leadership**	Mobile applications
Proiect management	**Modeling**	**Renewable energy**	Programming
Creative thinking	**Consumption reduction**	Critical thinking	Persuasion
Ethics	**Circular economy**	Virtual reality/ Augmented reality	Machine learning/deep learning
Responsibility	**Waste management**	Solving complex problems	Robotics/Smart hardwares
Adaptability, flexibility	Rapid prototyping	Good writing (reports, proposals, ...)	Big data
Quality	**Ecological sensitivity**	Automation	Complex data analysis
Sustainable product development	**Social responsibility**	Networking and IT systems	Artificial Intelligence
Display	**Drawing and layout**	Operations analysis	Blockchain
Design methodologies	**Crisis management**	Data visualisation	Quantum computing
Time management	**Advanced / ecological materials**	Simulation	



This list shows the global competencies in descending order according to their score in "importance". Those competencies with an average score of 3 or more are shown in bold.

The graphic shows the proportion of competencies in the first half of the list - the first two columns - that belong to each competency category.

Competencies defined as creative are underlined.

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Global competences

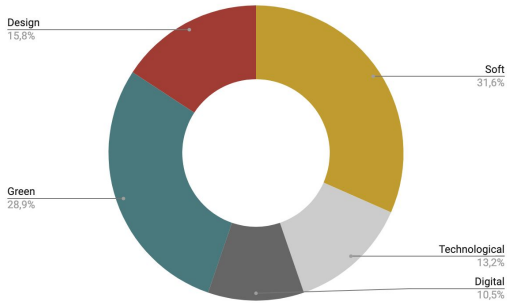
IMPORTANCE - STRENGTH + COMMITMENT TO IMPROVE

Time management
Industry 4.0
E-commerce and social media
Strategic planning
Consumption reduction
Communication
Energy efficiency
Innovation
Rapid prototyping
Sustainable product development
Pollution control
Clean technologies
Digital marketing
Teamwork
Creativity
Positive attitude
Ecological sensitivity
Renewable energy
Aesthetic sensitivity

Creative thinking
Resource management
Proiect management
Product management
User-centered design
Circular economy
Adaptability, flexibility
Design methodologies
Quality
Industrial design
Leadership
Self-management
Waste management
Networking and IT systems
Advanced / ecological materials
Ethics
Virtual reality/ Augmented reality
Life cycle analysis (LCA)
Responsibility

Crisis management
Social responsibility
Process Engineering
Automation
Display
Additive manufacturing/3D printing
Data visualisation
Modeling
Design research
DFMA
Emotional intelligence
Assertiveness
Empathy
Operations analysis
Solving complex problems
Ethics / Fair trade
Carbon footprint / carbon sequestration
Mobile applications
Programming

Cybersecurity
Programming
Simulation
Good writing (reports, proposals, ...)
Advanced logistics
Cloud computing
Critical thinking
Drawing and layout
Statistical analysis
Robotics/Smart hardwares
Artificial Intelligence
Cradle to Cradle Approach
Big data
Persuasion
Machine learning/deep learning
Complex data analysis
Blockchain
Quantum computing



This list shows the global competencies in descending order according to their score resulting from IMPORTANCE - STRENGTH + IMPROVE, thus considering together the three criteria assessed.

The graphic shows the proportion of competencies in the first half of the list - the first two columns - that belong to each competency category.

Competencies defined as creative are underlined.

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intride

Soft, Digital and **Green Skills** for **Smart Designers**: Designers as Innovative Triggers for SMEs in the manufacturing sector

Study about the “Soft, Digital & Green” critical competencies that a designer should have to successfully deploying innovation in SMEs manufacturing habitat products — Spanish workshop

WP3. Field analysis of state of the art — June 2020

CENFIM Furnishings Cluster

ELISAVA Barcelona School of Design and Engineering

LEITAT managing technologies

Co-funded by the Erasmus+ Programme of the European Union

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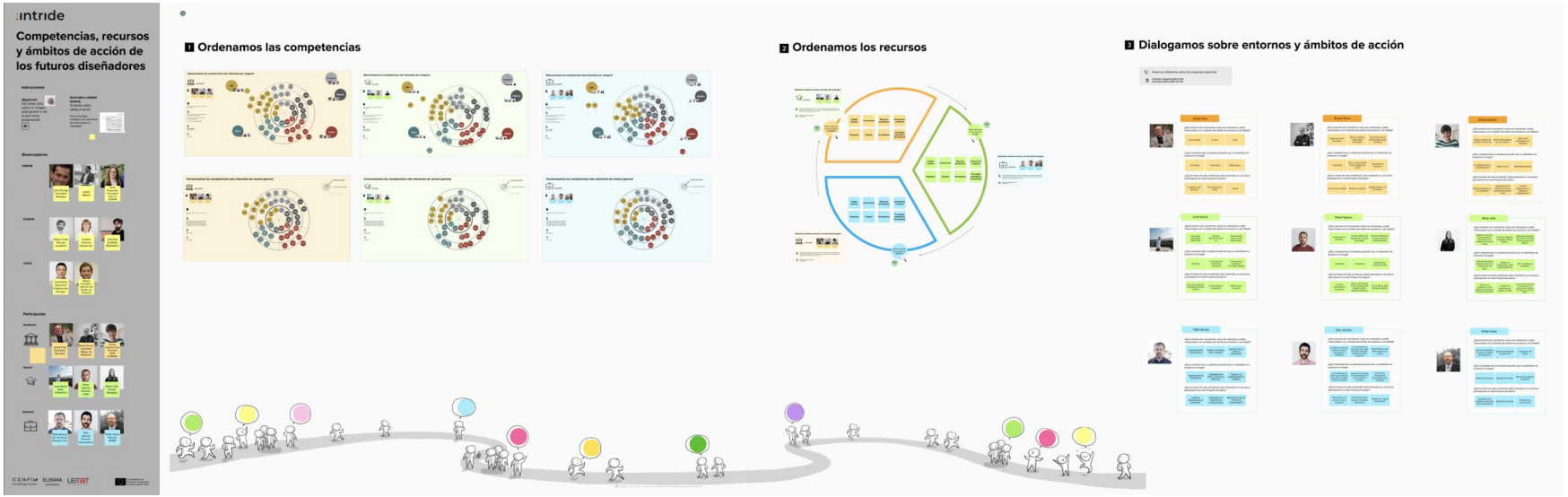
1. General Overview

Having a recorded **online workshop format** certainly presented an added challenge, particularly when trying to device the inner- working dynamics and logistics of it. It also introduced a learning curve, concerning both the potential participants and the organizers, when it came to interacting in such **virtual environments in both an engaging and effective way.**

That being said, almost all **participating parties** *(See Participants section)* verbally showed an appreciation for the opportunity to involve themselves in the dynamic and familiarize themselves with these new tools, while also displaying an interest in further sessions after giving a **generally positive feedback.**

In designing the **workshop methodology** *(See Dynamics section)*, we strived for balance to generate dynamics that were more strictly guided (Part I and II) and another (Part III) than acted more like an open forum for them to express their opinions and ideas on certain curated topics.

1. General Overview



Overview of the complete Virtual workspace for the National Workshop.

2. Participants

It was thought relevant to include a **diverse cluster of profiles** when drafting the list of possible candidates. These participants would then be grouped into three sectors: **SMEs, Academia, and Alumni.**

All workgroups were composed of three individuals, all related to the same sector, and a **Facilitator** in charge of them. A **General Coordinator** was put in place as well for the whole session, in order to help disseminate and implement the digital platforms amongst the participants.

The impact of having these sectors represented in the workshop proved very useful and helped in **qualifying and complementing the results and conclusions extracted from the survey,** all to expand our field of vision and gain a better understanding of many of the considerations a plausible JMDP should take into account.

Sector 1: SMEs

This group included three executive profiles from different companies with a wide range of activities:

· Industrial and Manufacturing Logistics.

· Sustainable Design & Development.

· Contract Furniture Manufacturing.

2. Participants

Sector 2: Academia

The Academic sector was comprised of three Directive and PHD profiles from different departments at ELISAVA :

· Director of Product Design Master's Degree

· Head of Studies of Degree in Design.

· Director of Furniture Design Master's Degree.

Sector 3: Alumni

Concerning the Alumni, all senior profiles were varied, composed of Product Designers with different areas of expertise:

· Lighting and Furniture Design.

· Outdoor and Urban Furnishing.

· Sustainable Design Management & Consultancy.

3. Selection of Skills

Based on the results from the initial survey, **a shortlist of skills was assembled in the consensus of all National Partners** (CENFIM, ELISAVA and LEITAT) and served as the basis to structure its different dynamics.

Skills Definitions

In regards to the workshop and concerning the skills and competences which appeared on the survey, **we uncovered some opportunities for further clarification**.

While some of the shortlisted skills self-describe and explain themselves well enough for all participants to understand, some of them still struck them as **being too broad or equivocal** and thusly stated they could perhaps be broken down into **more manageable and implementable categories**, regarding the JMDP.

This led to a firm push on what is an ongoing effort in defining each of the workshop selected skills further under strict criteria. This was helpful in order to level the field amongst all participants and **leave no room for ambiguous interpretations** while still facilitating their exchange of knowledge and conversation around these skills, particularly those which were identified as key ones by the vast majority.

3. Selection of Skills

Justification of Skills & Related Bibliography

The task for expanded definitions is also closely related to the pursuit of **identifying and indexing all of the selected skills in relevant academic and scientific literature.**

Aside from building a curated bibliography, this effort will aid in focusing and narrowing the field in future stages of the project, in regards to which skills can be justifiably implemented in the best and most efficient manner.
This will be especially **relevant when designing and defining the methodologies, approach, and context of the future academic program.**

We find taking these steps now will help us in **establishing the conceptual bridges** needed between the building blocks for the JMDP, in order to achieve full consensus with all partners involved, where necessary.

Skills Shortlist

Digital Skills

E-commerce

Digital Marketing

Networks & IT

Virtual & Augmented Reality

Programming & Coding

Cybersecurity

Advanced Computing

Data Literacy

Design Skills

Aesthetic Sensibility

Creative Thinking

Visualization

Design Methods

User Centered Design

Functionality

Ecological Sensibility

Design & Market Research

Curiosity

Criteria

Skills Shortlist

Green Skills

- Environmental Awareness
- Sustainable Product Development
- Clean Technologies
- Clean Energy & Energy Efficiency
- Gestión de Recursos
- Circular Economy
- Waste Management
- Advanced Materials Development

Soft Skills

- *Strategic Planning*
- *Communication*
- *Innovation*
- *Teamwork*
- *Positive Attitude*
- *Flexibility*
- *Leadership*
- *Literacy*
- *Ethics*
- *Responsability*
- *Assertiveness*
- *Time Management*

4. Workshop Dynamics

Part I: Evaluation & Hierarchization of Skills

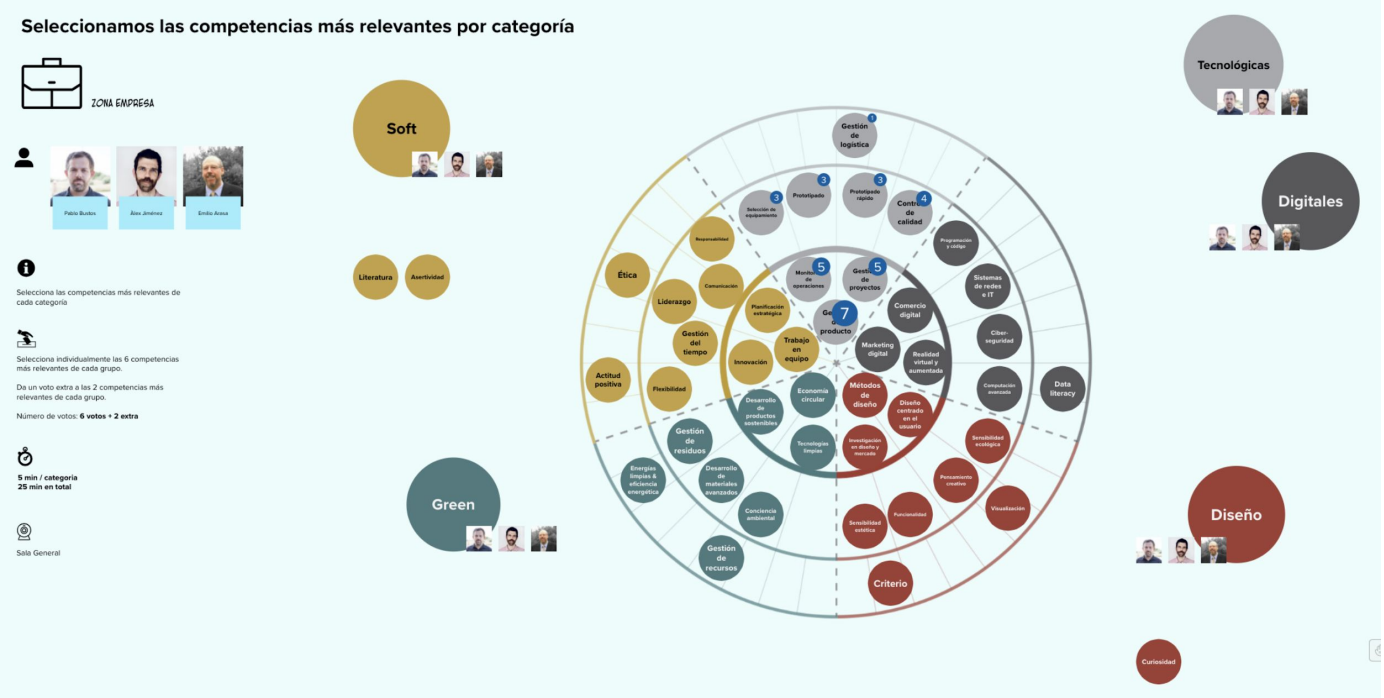
Goal:

The **first exercise** of the workshop was specifically designed to make all individual parties position themselves and cast a vote on every shortlisted skill within each of the general categories (Soft, Technological, Digital, Design, and Green).

Grouped by sector and following **a voting process**, each skill was placed in their respective Bull's Eye diagram.
Said map had three distinct circles of importance, where the most voted skills were placed by one of the Facilitators (CENFIM & ELISAVA). The closer to the center, the more voted that skill was by the participants. The number of skills that could be placed in each circle was limited, in order to **compel the participants to make a conscious decision.**

4. Workshop Dynamics

Part I: Evaluation & Hierarchization of Skills



Example of results from a voting round on Technological Skills.

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4. Workshop Dynamics

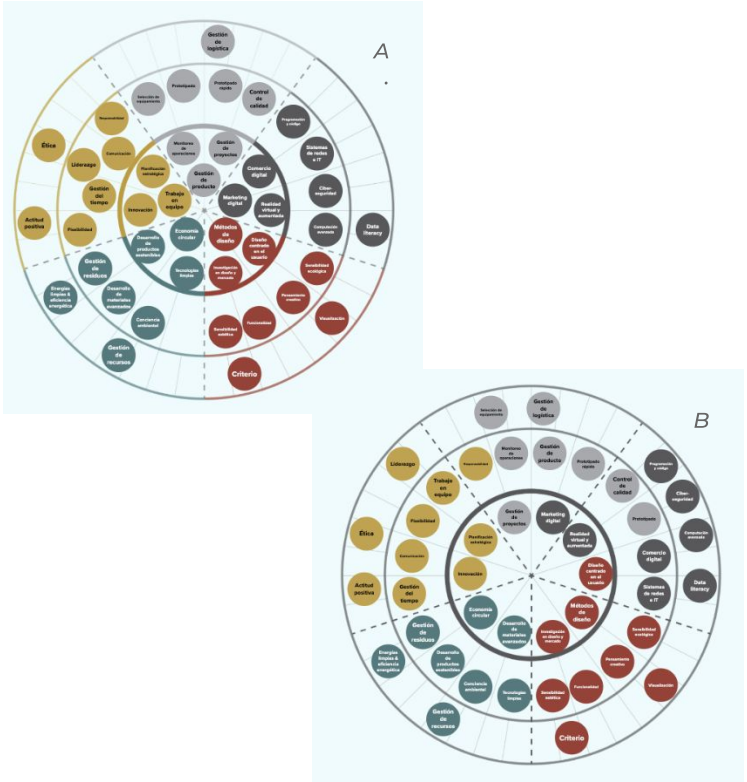
Part I: Evaluation & Hierarchization of Skills

Furthermore, after the workgroups had a **complete overview of their voting results**, they had the opportunity to meet privately with their Facilitators in a separate chat room. In there, the members could **freely discuss, debate, and reach a consensus if they wished to make any modifications** to their resulting skills diagram.

The key difference from the previous round was that there were no constraints placed on the number of skills per category they could place. In a very extreme example, they could have filled the center slots with only skills pertaining to the Green category, had they so wished.

Output:

The results did not differ greatly from their original diagrams, however, every sector did choose to alter their voting results in some capacity, allowing them to qualify and inform the enriching debate with their own experiences.



A. Initial Diagram after Voting session .
B. Resulting Skill Diagram after debate.

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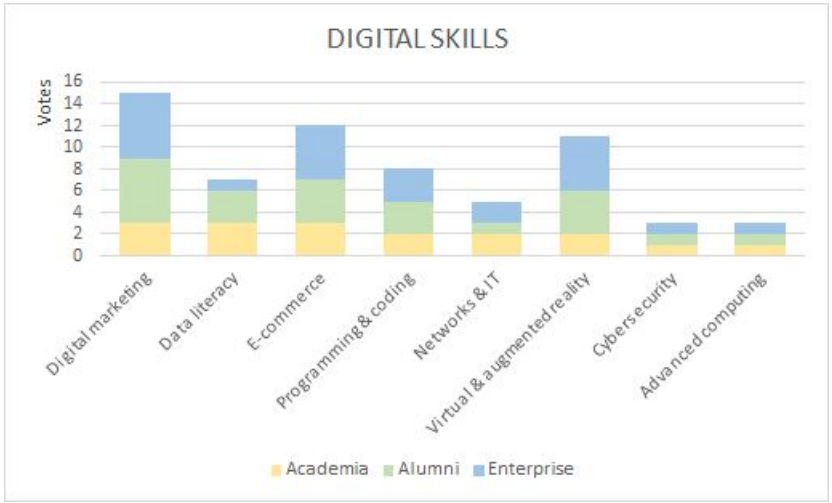
4. Workshop Dynamics

Part I: Evaluation & Hierarchization of Skills

Results:



The graphic shows the voting results of each group (Academia, Alumni & Enterprise) regarding Digital Skills. Moreover, the total height of the bar offers a global overview of the sum of the votes collected for each skill.

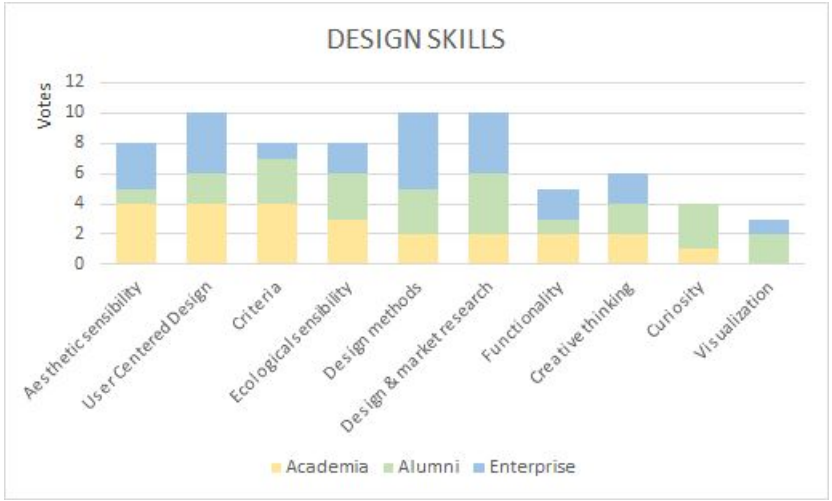
The most voted Digital Skills were:

- **Digital marketing**
- **E-commerce**
- **Virtual & augmented reality**
- **Programming & coding**

4. Workshop Dynamics

Part I: Evaluation & Hierarchization of Skills

Results:



The graphic shows the voting results of each group (Academia, Alumni & Enterprise) regarding Design Skills. Moreover, the total height of the bar offers a global overview of the sum of the votes collected for each skill.

The most voted Design Skills were:

- **User Centered Design**
- **Design methods**
- **Design & market research**
- **Aesthetic sensibility**
- **Criteria**
- **Ecological sensibility**

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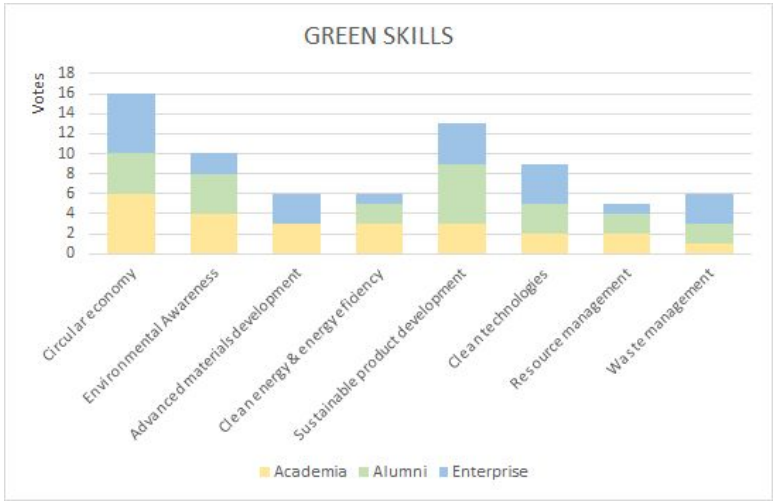
4. Workshop Dynamics

Part I: Evaluation & Hierarchization of Skills

Results:



The graphic shows the voting results of each group (Academia, Alumni & Enterprise) regarding Green Skills. Moreover, the total height of the bar offers a global overview of the sum of the votes collected for each skill.

The most voted Green Skills were:

- **Circular economy**
- **Sustainable product development**
- **Environmental Awareness**
- **Clean technologies**

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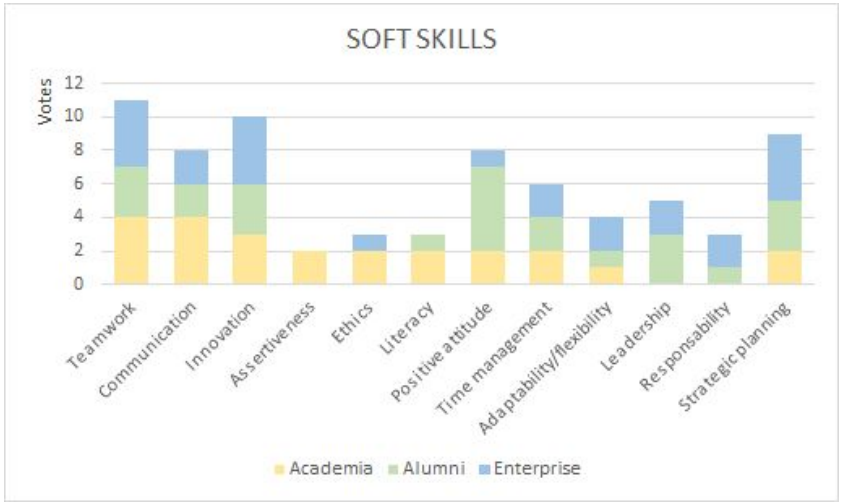
4. Workshop Dynamics

Part I: Evaluation & Hierarchization of Skills

Results:



The graphic shows the voting results of each group (Academia, Alumni & Enterprise) regarding Soft Skills. Moreover, the total height of the bar offers a global overview of the sum of the votes collected for each skill.

The most voted Green Skills were:

- **Teamwork**
- **Innovation**
- **Strategic planning**
- **Communication**
- **Positive attitude**
- **Time management**

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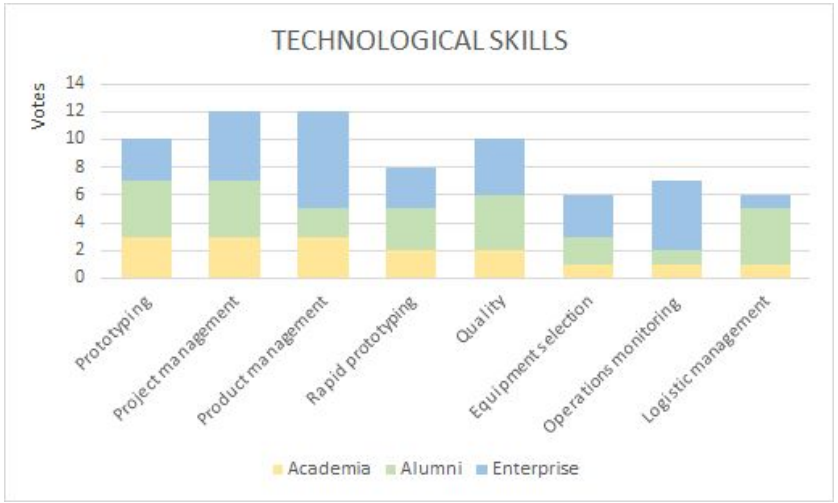
4. Workshop Dynamics

Part I: Evaluation & Hierarchization of Skills

Results:



The graphic shows the voting results of each group (Academia, Alumni & Enterprise) regarding Technological Skills. Moreover, the total height of the bar offers a global overview of the sum of the votes collected for each skill.

The most voted Green Skills were:

- **Project management**
- **Product management**
- **Prototyping**
- **Quality**
- **Rapid prototyping**

4. Workshop Dynamics

Part II: Identifying Relevant Resources from Key Actors

Goal:

The workshop and it's diverse participants also provided a more than adequate stage to **rethink the relationship between all of these actors** (SMEs, HEIs and Professionals) in the context of a future JMDP. This was orchestrated by making each sector **assess and evaluate their own resources individually**, (Human Capital, Knowledge, Economic Resources, Facilities & Spaces, Projects, Clients, Suppliers and Technology, Materials & Tools) and then asking them **to repeat the exercise regarding the other two sectors** in a similar fashion.

4. Workshop Dynamics

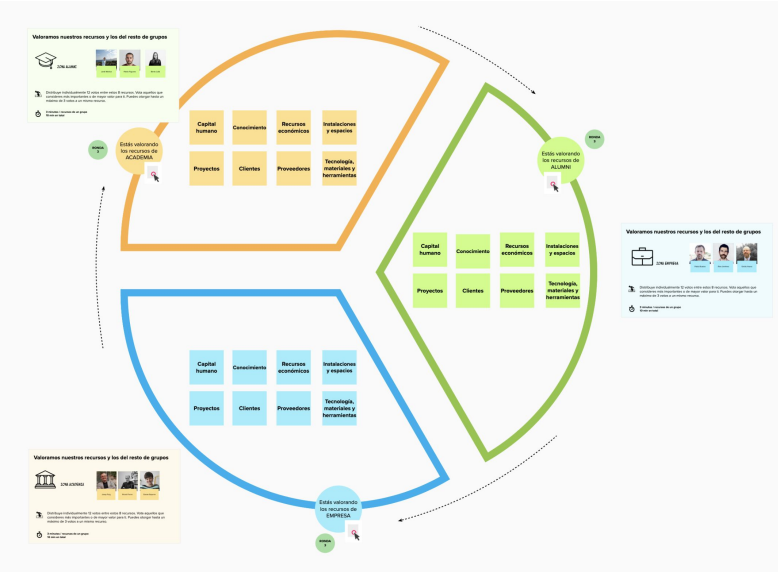
Part II: Identifying Relevant Resources from Key Actors

Consisting of three voting rounds, this dynamic had the participants vote individually on their own resources. The aim was for them to define their perceived strengths and value. In consecutive rounds they would have to do the same, but regarding the other two sectors.

Output:

This gave us a better **understanding of how these participants perceive themselves collectively**, and also how they perceive the two others. The dynamic illuminated on new possible and interesting **trade-offs for each actor**.

Leading them to find opportunities which could arise when encouraged to not only **rethink and innovate in what their role currently is**, but also what it could be in the future in interconnected and fluid environments.



Starting with their own, participants went around the board voting on which resources they perceived as most valuable.

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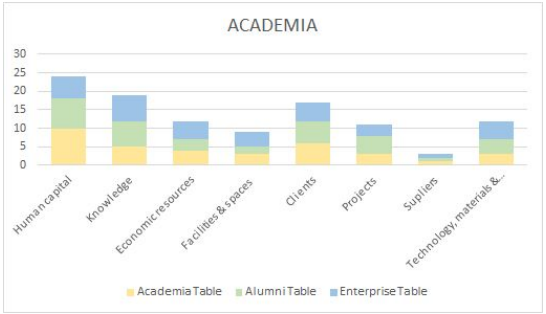
4. Workshop Dynamics

Part II: Identifying Relevant Resources from Key Actors

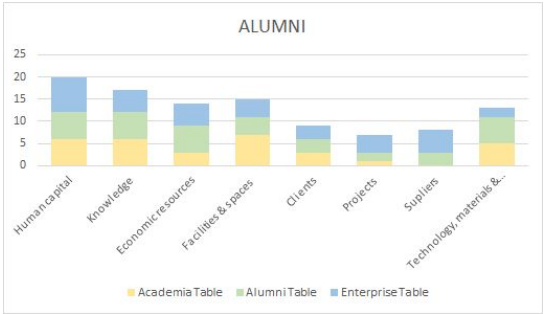
Results:

These graphics show the voting results of the three groups (Academia, Alumni & Enterprise) though all resource's tables. Furthermore, the total height of the bars offer a global overview of each group considering the different actors.



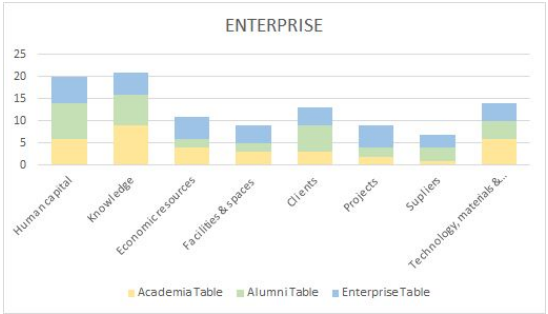
The most voted resources by Academia group were:

- **Human capital**
- **Knowledge**
- **Clients**
- **Economic resources / Tech., materials & tools**



The most voted resources by Alumni group were:

- **Human capital**
- **Knowledge**
- **Facilities & spaces**
- **Economic resources**



The most voted resources by Enterprise group were:

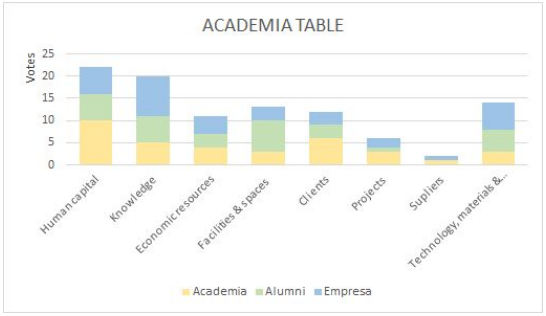
- **Knowledge**
- **Human capital**
- **Technology, materials & tools**
- **Clients**

4. Workshop Dynamics

Part II: Identifying Relevant Resources from Key Actors

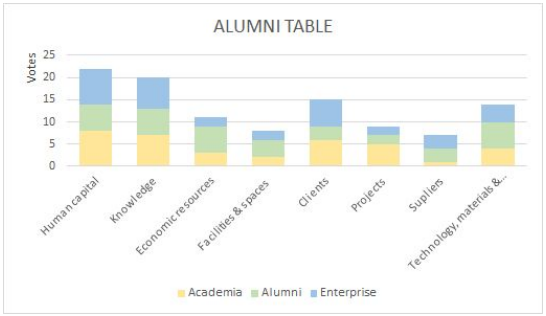
Results:

These graphics show the voting results in all tables by the three groups (Academia, Alumni & Enterprise). Each graphic shows which resources are more valued based on the evaluation of all the actors.



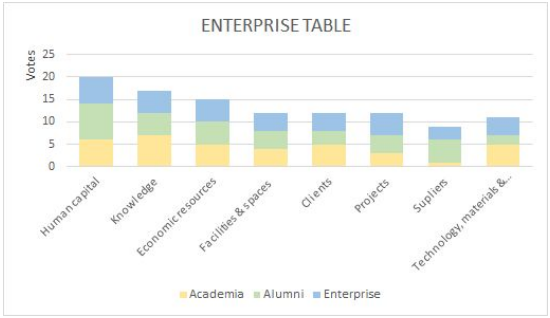
The most voted resources in Academia table are:

- **Human capital**
- **Knowledge**
- **Technology, materials & tools**
- **Facilities & spaces**



The most voted resources in Alumni table are:

- **Human capital**
- **Knowledge**
- **Clients**
- **Technology, materials & tools**



The most voted resources in Enterprise table are:

- **Knowledge**
- **Human capital**
- **Economic resources**
- **Facilities & spaces / Clients / Projects**

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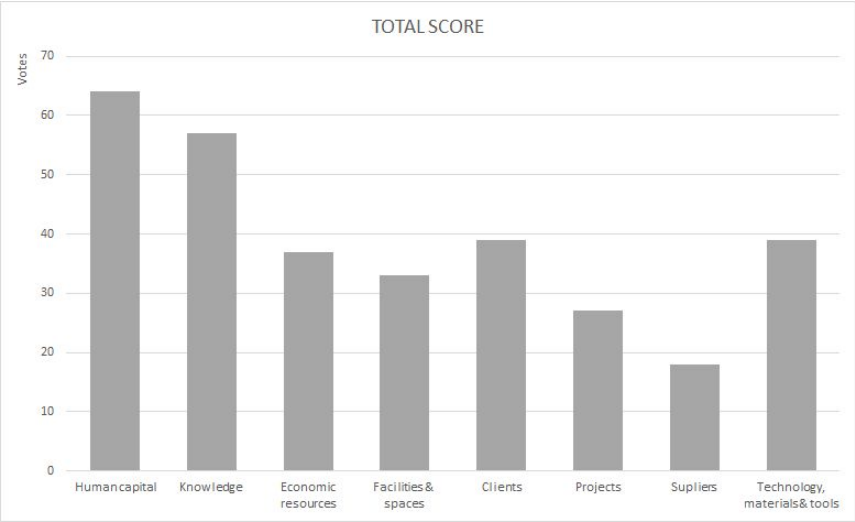
ELISAVA
LEITAT managing technologies

4. Workshop Dynamics

Part II: Identifying Relevant Resources from Key Actors

Results:



The total sum of the first group of three graphs and the second group is equal. This sum is showed in the graph and represents the most voted resources, regardless of who the votes come from.

The most voted Resources were:

- **Human capital**
- **Knowledge**
- **Clients**
- **Technology, materials & tools**

4. Workshop Dynamics

Part III: Round Table & Debate on Key Topics

Goal:

The **final exercise** of the workshop was a bit more uninhibited and contemplative, when compared to the first two heavily restricted dynamics. Every participant had a separate virtual workspace set up for them, where they were presented with **three guiding questions around three main topics: Emerging environments, *Sine qua non* Skills for designers, and Takeaways/Expectations** from their current and future involvement in the INTRIDE project.

4. Workshop Dynamics

Part III: Round Table & Debate on Key Topics

· In your view, which emerging environments will be relevant, related to Product & Habitat Design practices?

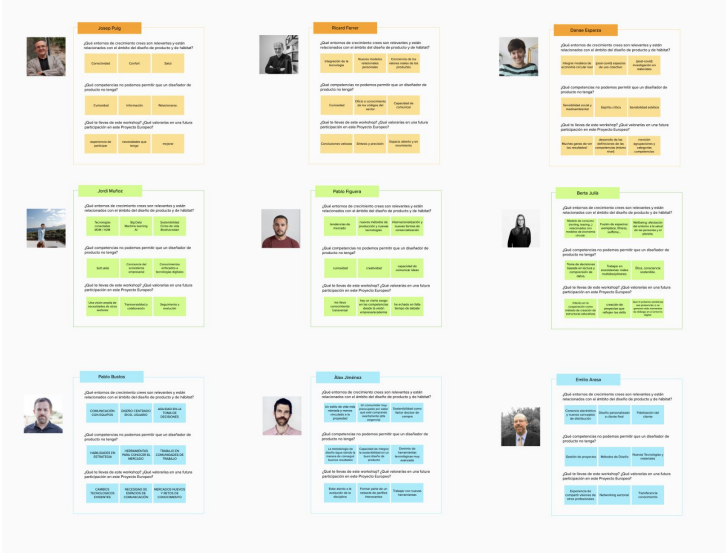
· Which Skills do you believe we must not allow Product Designers to go without?

· What are your main takeaways from the Workshop? What would you value most in a future involvement with the INTRIDE Project?

Output:

These topics were also set by a consensus from all National Partners. They were seen as **opportunities to expand on fields of interest** that were somewhat constrained on the original survey and that could further inform future approaches and possible declinations of the JMDP, while also alerting of certain biases.

After they had answered each question individually, they were prompted by the Coordinator to **elaborate on their answers, enabling them to explain their own point of view to all other participants.** That, in turn, enabled us to further pick up on the nuances of the matter, by initiating a focused debate around their answers.



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4. Workshop Dynamics

Part III: Round Table & Debate on Key Topics

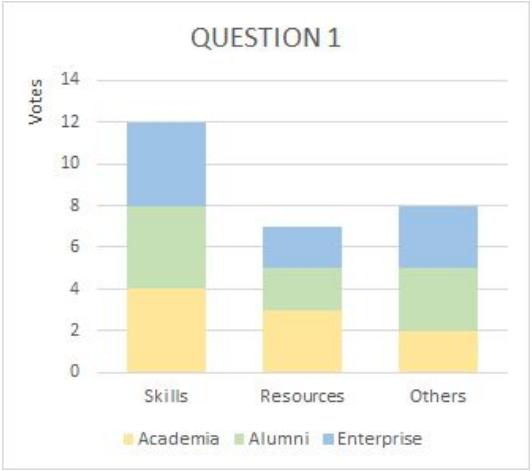
Results:

Question 1 - In your view, which emerging environments will be relevant, related to Product & Habitat Design practices?

The open answers are more prone to a subjective interpretation. For this reason they have been classified in three main groups: *Skills*, *Resources* and *Others*.

The graph related to Question 1 a balance distribution although there is an inclination towards *Skills*. The mentioned Skills in the answers were: Soft Skills (x3), Green Skills (x2), Digital Skills (x2), Design Skills (x1) and Other Skills (x4).

Those Skills that could not be classified in one of the five major proposed proposed(Design, Digital, Soft, Green and Technological) have been considered Other Skills.



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4. Workshop Dynamics

Part III: Round Table & Debate on Key Topics

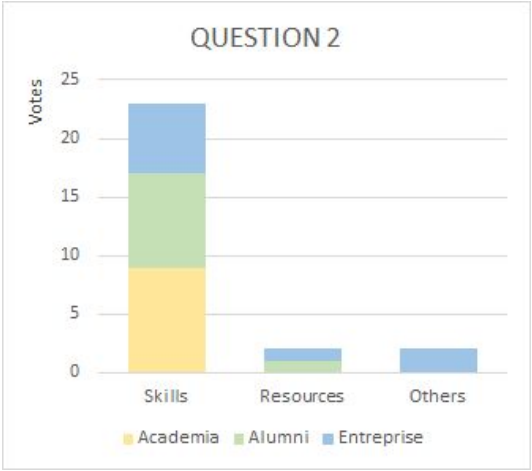
Results:

Question 2 -Which Skills do you believe we must not allow Product Designers to go without?

The open answers are more prone to a subjective interpretation. For this reason they have been classified in three main groups: *Skills*, *Resources* and *Others*.

In the graph related to Question 2 most of the answers were related to *Skills*: Design Skills (x8), Soft Skills (x7), Green Skills (x1), Digital Skills (x1), Technological Skills (x1) and Other Skills (x1). *Resources* and *Others* were mentioned approximately the same number of times: four and five times.

Those Skills that could not be classified in one of the five major proposed proposed(Design, Digital, Soft, Green and Technological) have been considered Other Skills.



4. Workshop Dynamics

Part III: Round Table & Debate on Key Topics

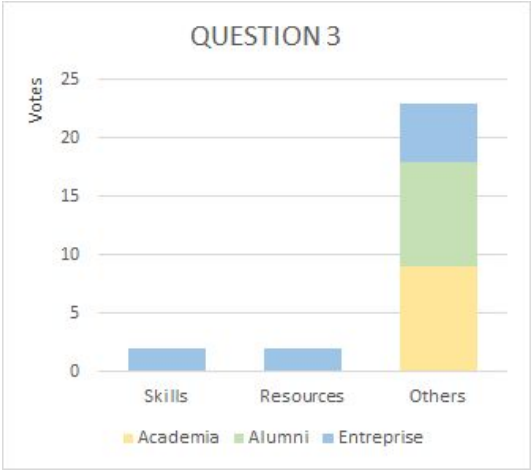
Results:

Question 3 - What are your main takeaways from the Workshop? What would you value most in a future involvement with the INTRIDE Project?

The open answers are more prone to a subjective interpretation. For this reason they have been classified in three main groups: *Skills*, *Resources* and *Others*.

The answers represented in the graph, related to Question 3, were mainly related with the topic *Others*. *Resources* only appears twice and *Skills* also twice: Technological Skills (x1) Other Skills (x2).

Those Skills that could not be classified in one of the five major proposed proposed(Design, Digital, Soft, Green and Technological) have been considered Other Skills.



4. Workshop Dynamics

All of the participating parties showed **an avid interest in the INTRIDE project**, manifesting what they thought to be an interesting scope, and one of considerable beneficial results for all actors involved. Most notably, to stay connected with not only a national network of actors but also a European forum for **transversal dialogue** on the sector's needs, trends, developments, and continuous evolution.