Challenges in advanced computing and functionalities

Skills Needs, Shortages and Gaps in the Semiconductor Industry – Survey Findings

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13th of May 2024

Overview & Partners

Mission: Reinforcing Europe's competitiveness in processors and semiconductors through secretariat coordination of the EU Industrial Alliance.

OBJECTIVES

- **Objective 1**: Set up and maintain the secretariat of the Alliance
- **Objective 2**: Promote EU sovereignty and competitiveness
- **Objective 3**: Strengthen Europe's industrial capacities
- **Objective 4**: Develop an engaged community

POLICY NETWORK & SYNERGIES

- 3 market trends reports
- 6+ Thematic Working Groups (TWGs)
- 6 landscape and gap analysis reports International partnerships
- 50+ synergies with relevant initiatives
- 50+ best practices showcased in the Observatory

REPORTS

- 5 EU Policy briefs produced on the basis of the TWGs' work
- 3 Impact reports
- 3 Recommendations Roadmap

COMMUNITY

- 1500+ engaged community members across all Stakeholder Groups
- Community DB of 2000+ contacts

OUTREACH

- 3 Alliance General Assembly Meetings
- 3 Annual Alliance Forums
- 18 Webinars
- 33 Newsletters
- 12 Digital Magazines
- 3 Press Releases
- 6 Marketing campaigns
- 20 3rd party events attended
- 3 general videos and 14 topic-specific

- Coordination and Support Action (CSA) project funded by the European Commission Digital Europe Programme.
- The project kicked off in January 2023 and will run for 36 months.

IDC	Trust-IT Services	COMMpla	OpenForum Europe	WHITE
• Financial & Administrative Coordinator • Observatory • Market analysis	• Technical Coordinator • Secretariat support • Dissemination & comms	• Platform development & maintenance • Web & graphics	• Engagement & synergies • Open technologies	• Engagement & synergies • Events management
https://www.idc.com	https://www.trust-itservices.com	https://commpla.com	https://openforumeurope.org	https://white-research.eu

ALLPROS.eu – Activities & achievements

Activities to-date

Q1-23 | Q2-23 | Q3-23 | Q4-23 | Jan 24 | Feb 24 | Mar 24

Communications Channels
- Monthly newsletters
- Weekly social media updates

New Launches
- ALLPROS.eu International Observatory
- ALLPROS.eu Marketplace

Secretariat Support towards Chips Act Implementation

Workshops Organised

Videos Produced

Outputs

Post-event report Open Silicon

First results of IT skills surveys Semiconductors

Chip Chronicles 2° Issue

Launch of IT skills surveys in Semiconductors

Marketplace Launch

Final results of IT skills surveys Semiconductors

Thematic Working Group on Skills

Activities Supported / to participate in

ERACON 2023

EPoSS Annual Forum 2023

METIS Survey: Skills needs in the European microelectronics industry

ECS

Video / Interview Blogs

Françoise Chombarr

Christopher Frieling

Lucilla Sioli

Aude Jalabert

Marta Garcia Casulla

Valeria Soldero

Diva Tommei

Sytske Walk

Future Activities
- ALLPROS Stakeholder Forum
- Webinars
- Workshops
- TWG outputs & publications
- Policy briefs

IDC | WHITE | ofe OpenForum Europe | COMMpla Communication Platforms and Online Solutions | Trust-IT Services communicating to markets

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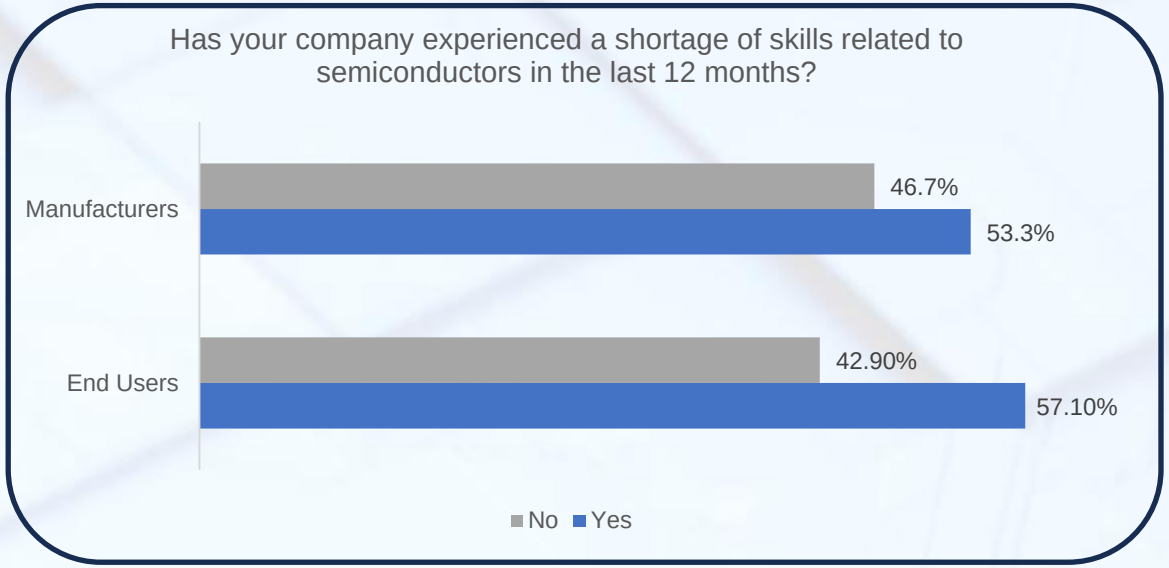
Current Overview

Skills shortage – Reality or speculation?

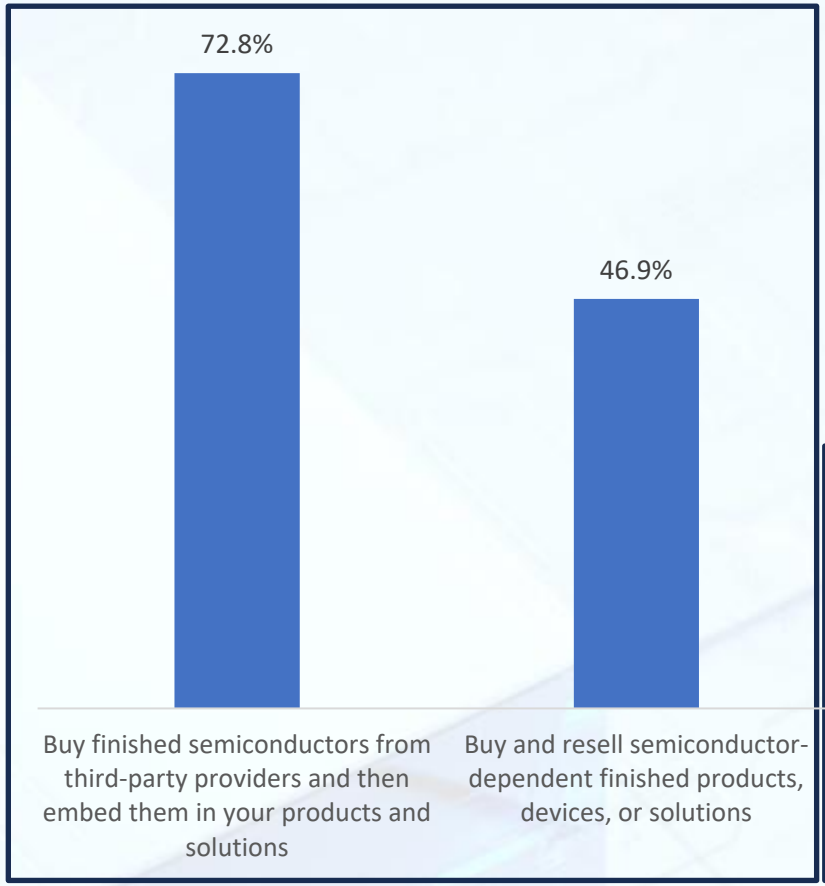
- **The skills shortage is evident** - Over half of respondents, both within semiconductor manufacturers and end user industries have experienced skill shortages over the last 12 months.
- While all industries expressed concerns with the skills gap, **Pharmaceuticals (67%) and IT/computing (62%) seem to be the most affected sectors.**
- Parallelly, **around one third of the end user industry is looking to hire** specialized staff to work on semiconductors.
- Hiring **pressure is even stronger for semiconductor manufacturers**, as over 78% of respondents in Europe are looking to recruit specialized staff



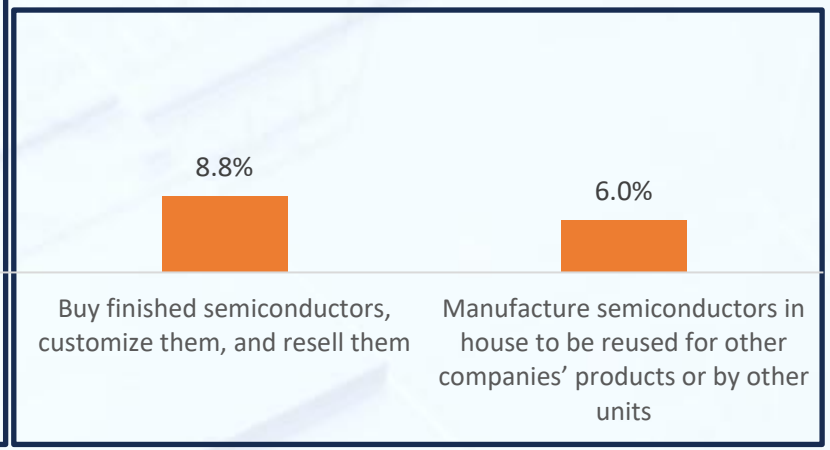
Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, FINAL DATA, September 2023

End users still heavily rely on manufacturers for their semiconductors needs

With respect to semiconductors usage; does your company:

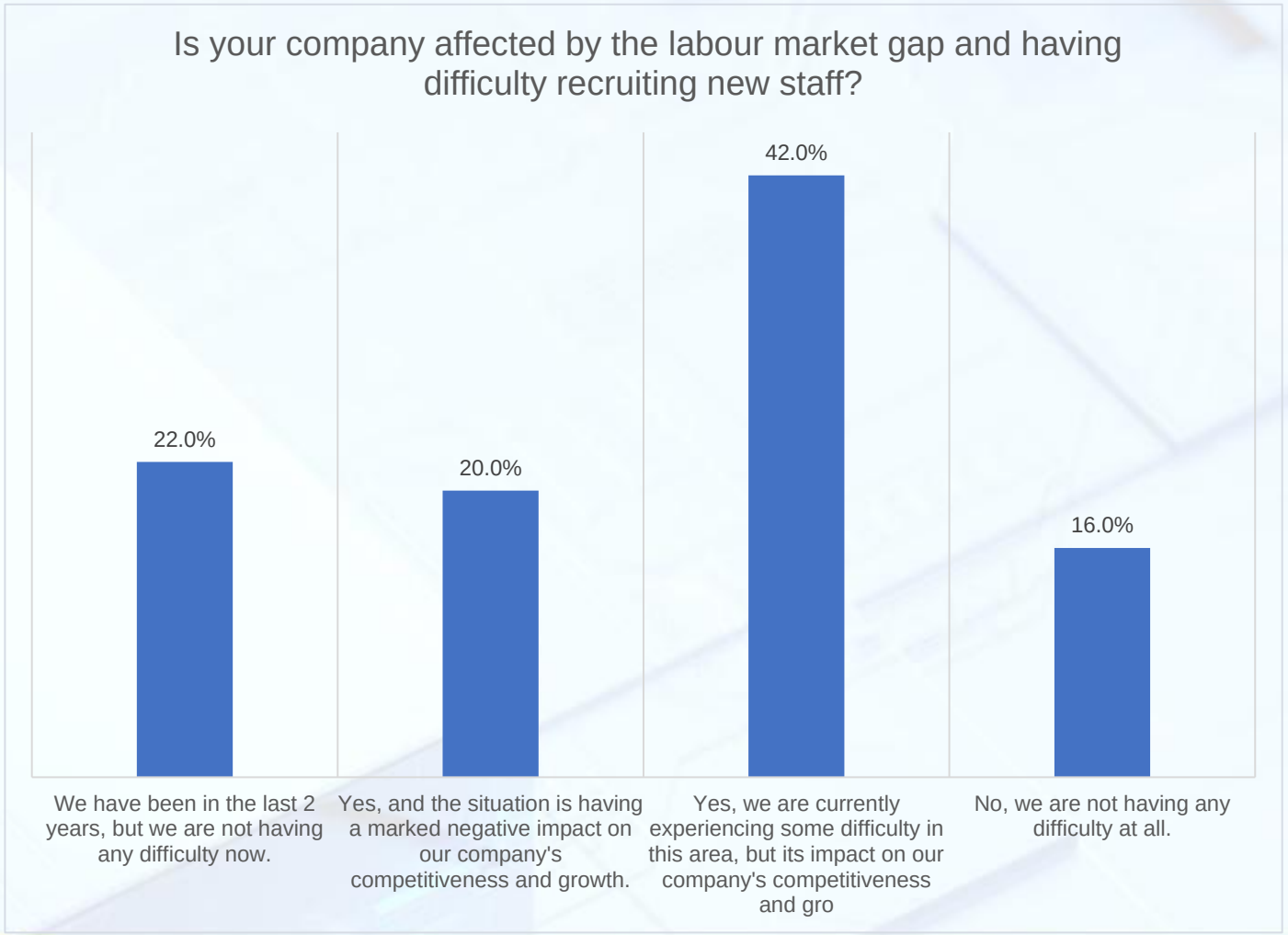


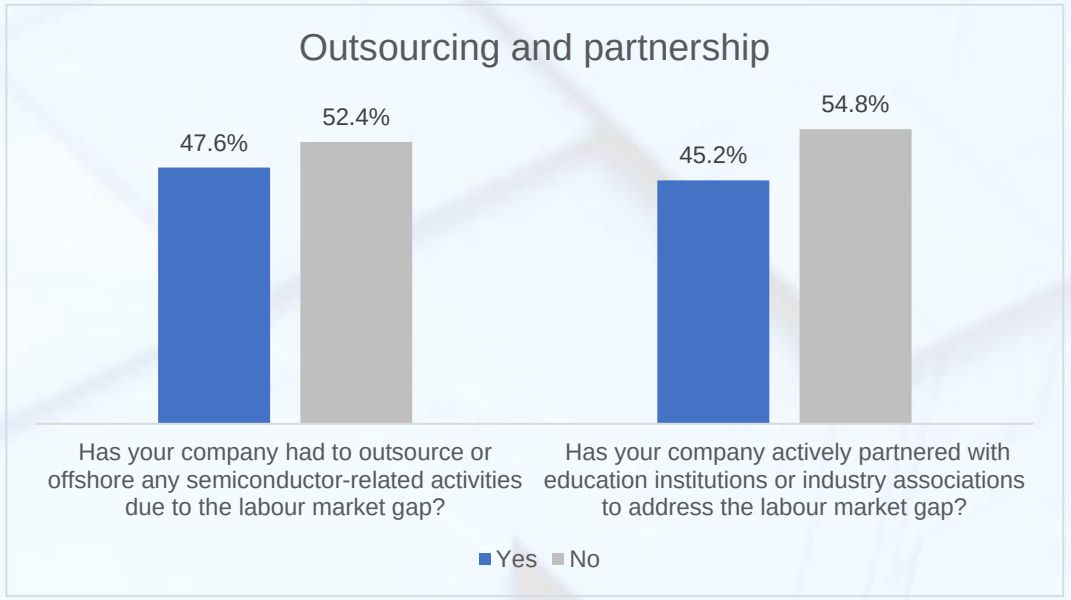
72.8% of respondents claim they still **heavily rely on value-chain partners** since they have failed to build a strong talent pool to design semiconductors within the company.



72.2% of respondents believe the recent shortage of semiconductors has **made them rethink sourcing models** to gain more control over how semiconductors are developed. **However, only a small part of end users effectively have the capacity and currently do it.**

Additional data – Skill gap and recruiting (Manufacturers)

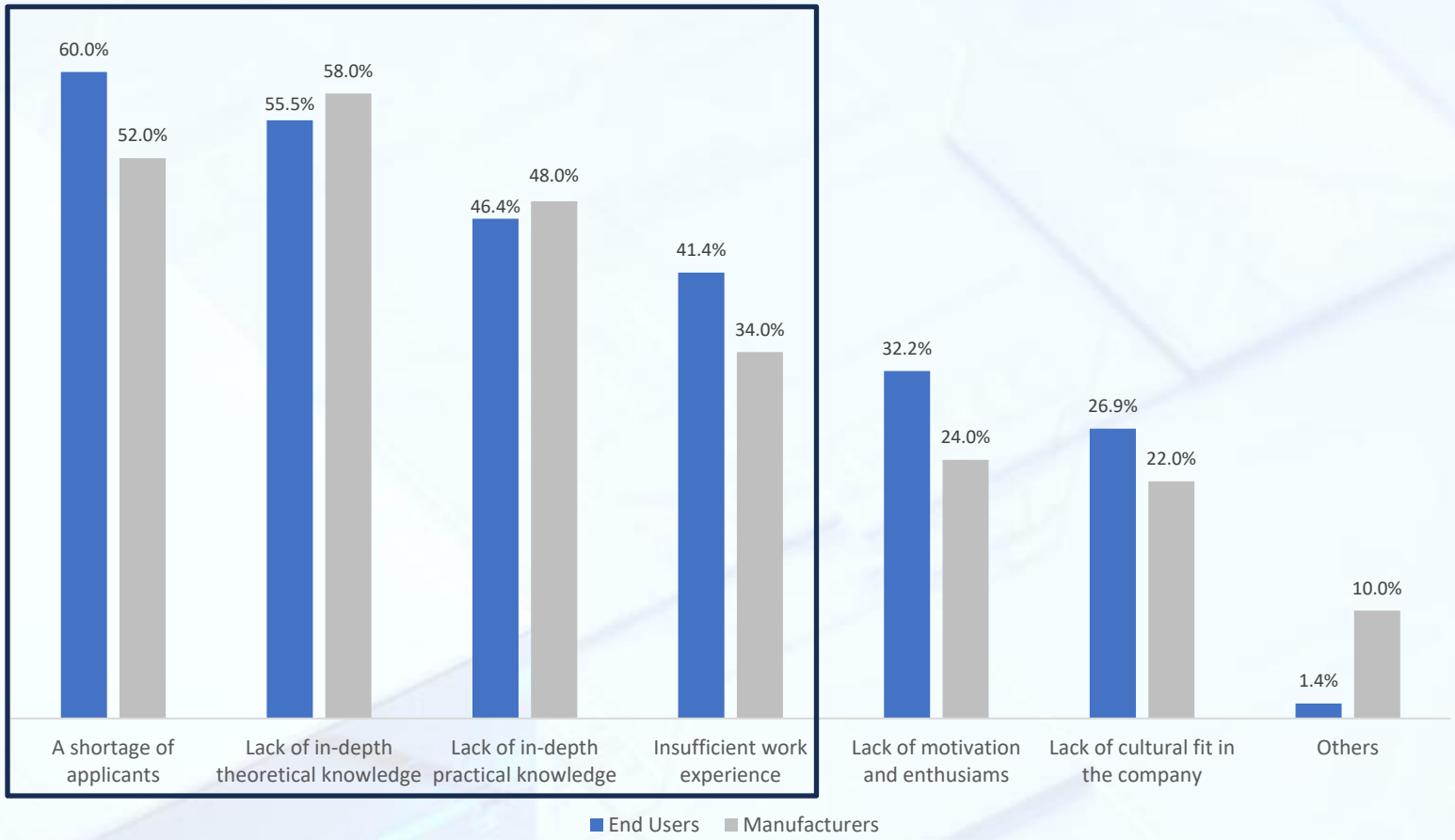




Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, FINAL DATA, September 2023

Problems faced when recruiting staff

What problems does your company usually face when recruiting technical staff?

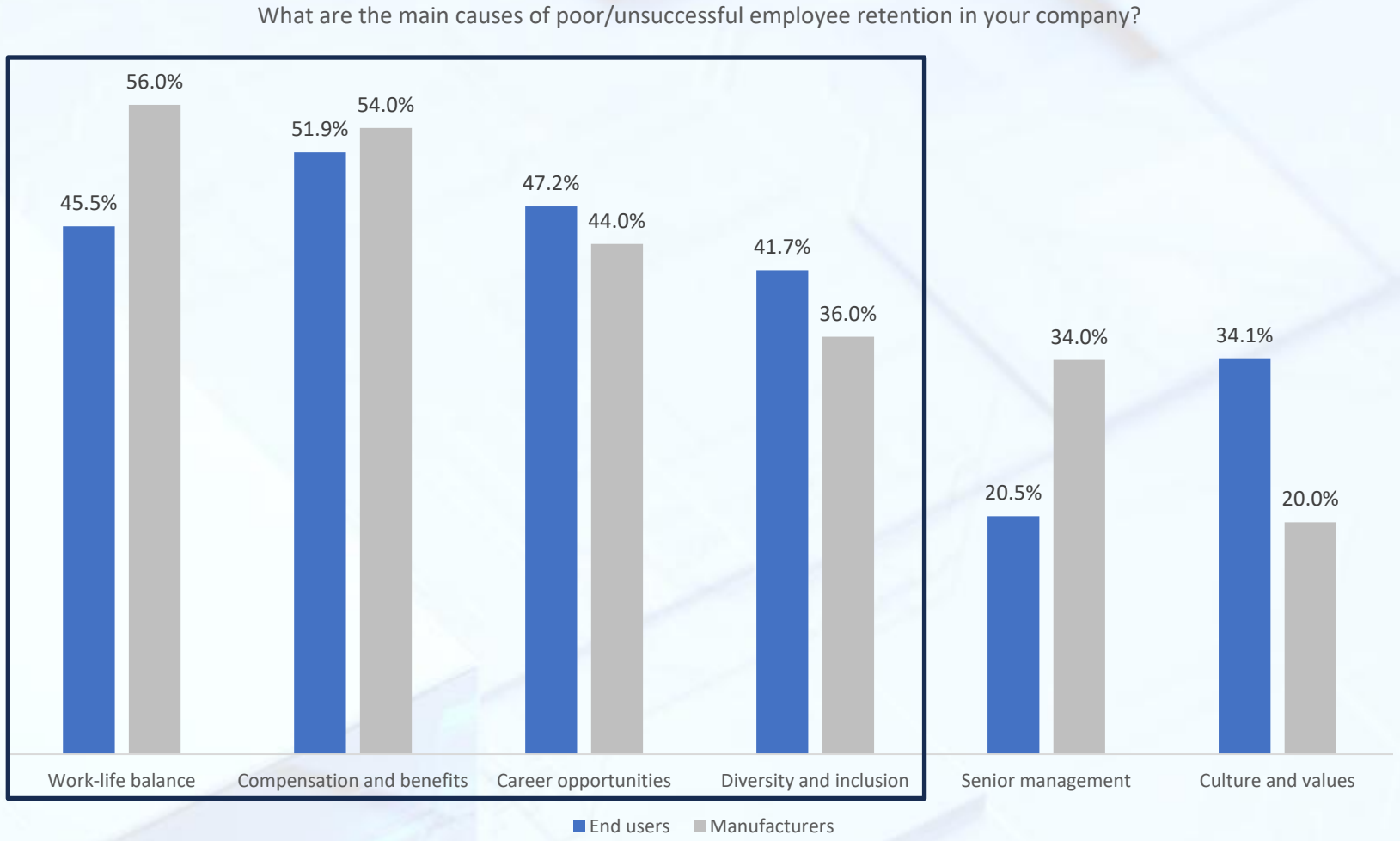


- **Shortage of applicants, lack of practical/theoretical knowledge and insufficient work experience** are the top three reasons behind the staff shortage in semiconductors, both for manufacturers and end user industries.

- In addition, **27% end user respondents have expressed lack of cultural fit in the company** as a key reason for the difficulties in recruiting workers in semiconductors.

Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, FINAL DATA, September 2023

What about employee retention?



Work life balance, Compensation and lack of career opportunities and Diversity & Inclusion are factors that seem to be affecting end user industries and manufacturers equally when it comes to retention.

For manufacturers, there is also an emphasis on the **dissatisfaction with senior management.**

For end user industries, issues on the organization's culture and values impacts more than manufacturers.

Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, FINAL DATA, September 2023

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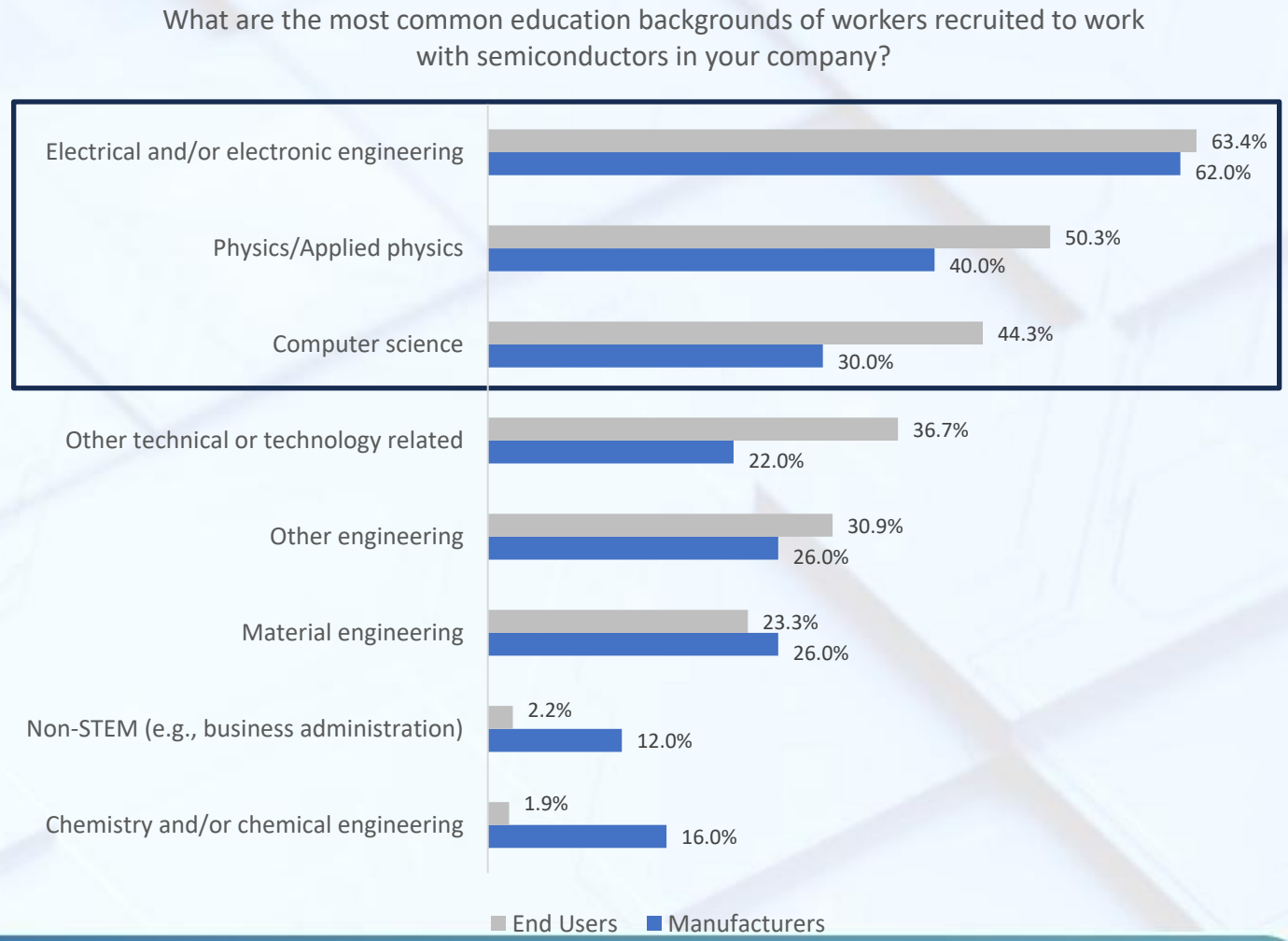
Skills Needs and Education

Educational background

- Electrical/Electronic Engineering is the **most common and sought after background** to work in semiconductors, followed by physics and Computer science.

- This is the case for **both pure manufacturers and the end user industry**, showing a **potential for saturation** when it comes to finding such talents.

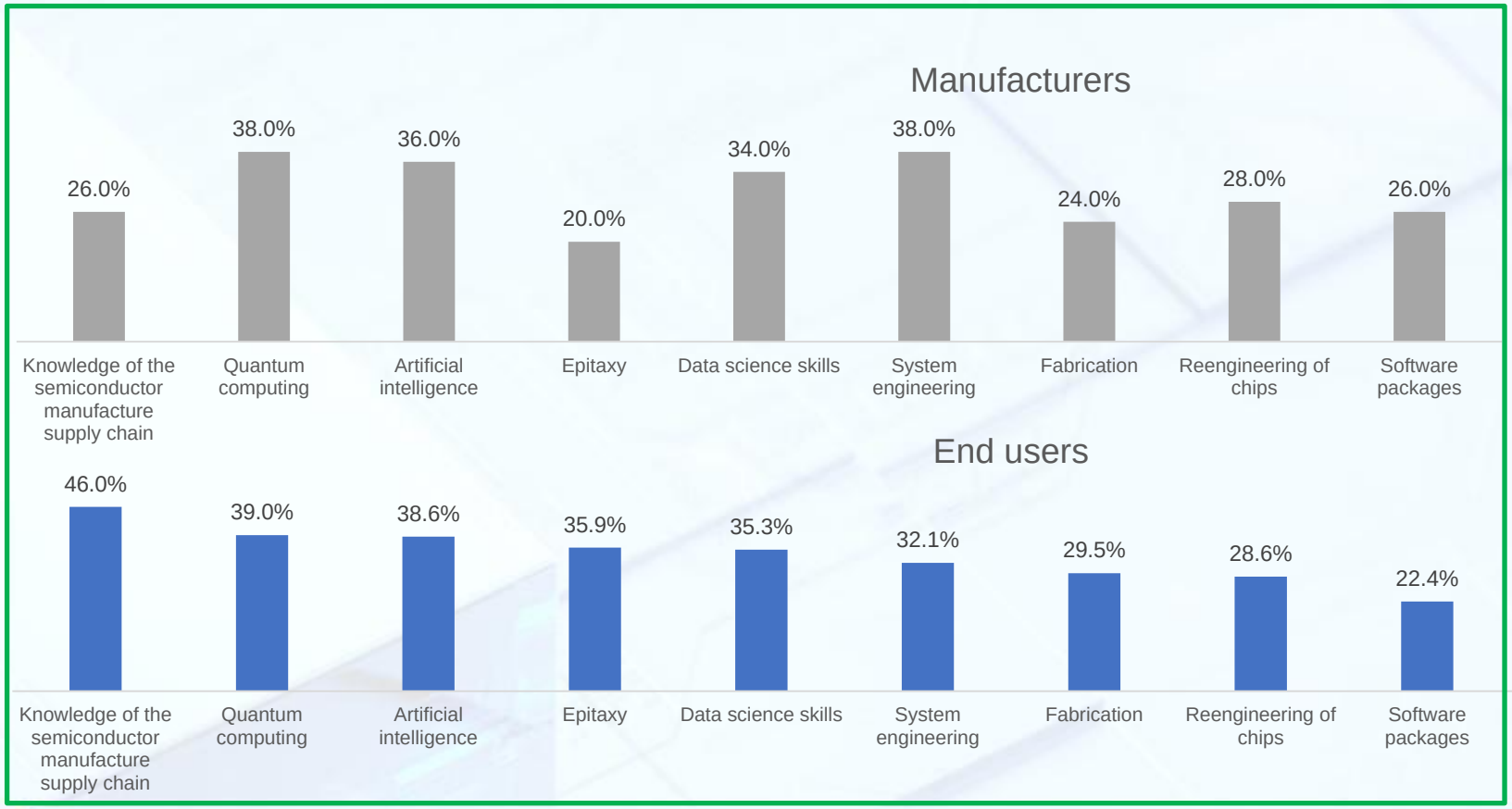
- **Non-STEM background proves to be less common for workers in semiconductors** despite the current strong need for business/soft skills in the industry.

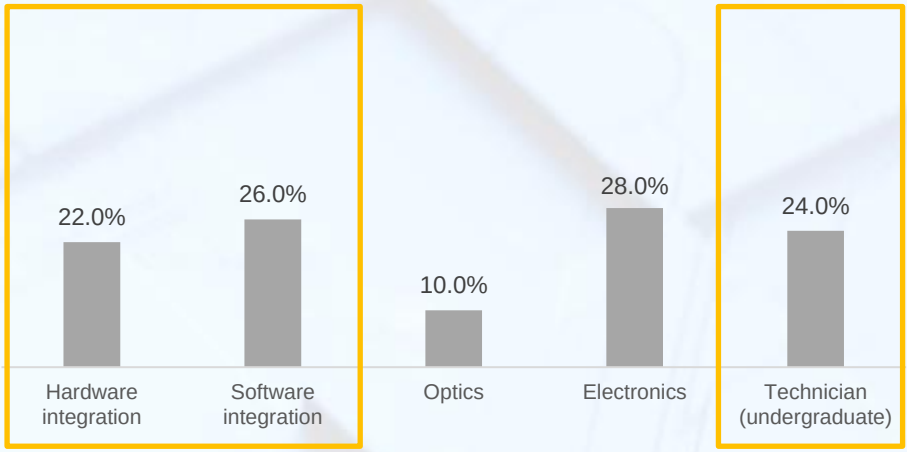


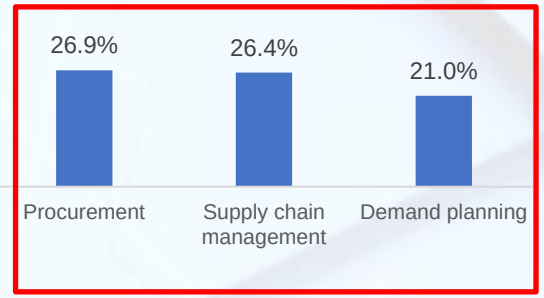
Technical skills gaps – End users vs Manufacturers

Gaps in certain skills areas such as AI, system engineering, quantum and data science **can be seen for both semiconductor manufacturers and end user industries**.

Overall, **manufacturers seem to struggle more** with skills related to software and hardware integration, as well as the lack of technicians available to their workforce. (see slide on internships)







End user industries also struggle with the **lack of skills in areas that help managing the relationship with manufacturers**, such as procurement and demand planning of semiconductors

Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, FINAL DATA, September 2023

What about human/business skills?

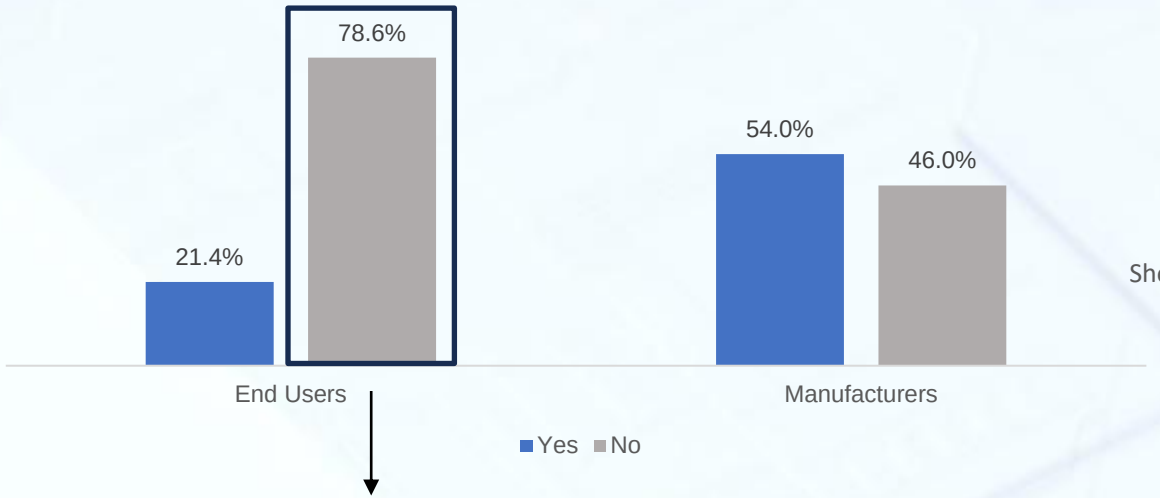
Human skills needs from both semiconductors manufacturers and end user industries are similar.

Semiconductor talent is heavily biased towards STEM backgrounds

Soft Skills should be internally developed further by semiconductor companies during the employee's tenure.

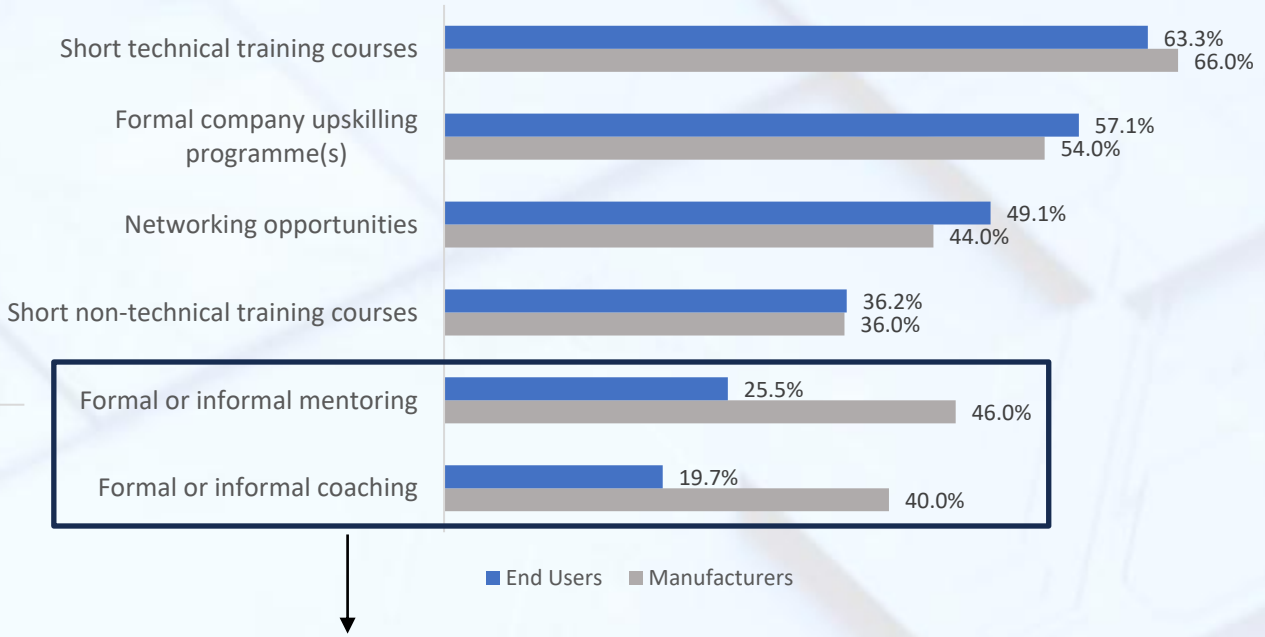
Internships and Professional development within semiconductors

Does your company offer student work placements (internships) in manufacturers or semiconductor-related units at the end user side?



The vast majority of end user industry respondents (78.6%) **claimed there are no internship programs within their semiconductor-related units.**

In what ways does your company support the professional development of existing staff?



End user companies are also less prone to use formal and informal mentoring/coaching to upskill their semiconductors' employees vs manufacturers

Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, FINAL DATA, September 2023

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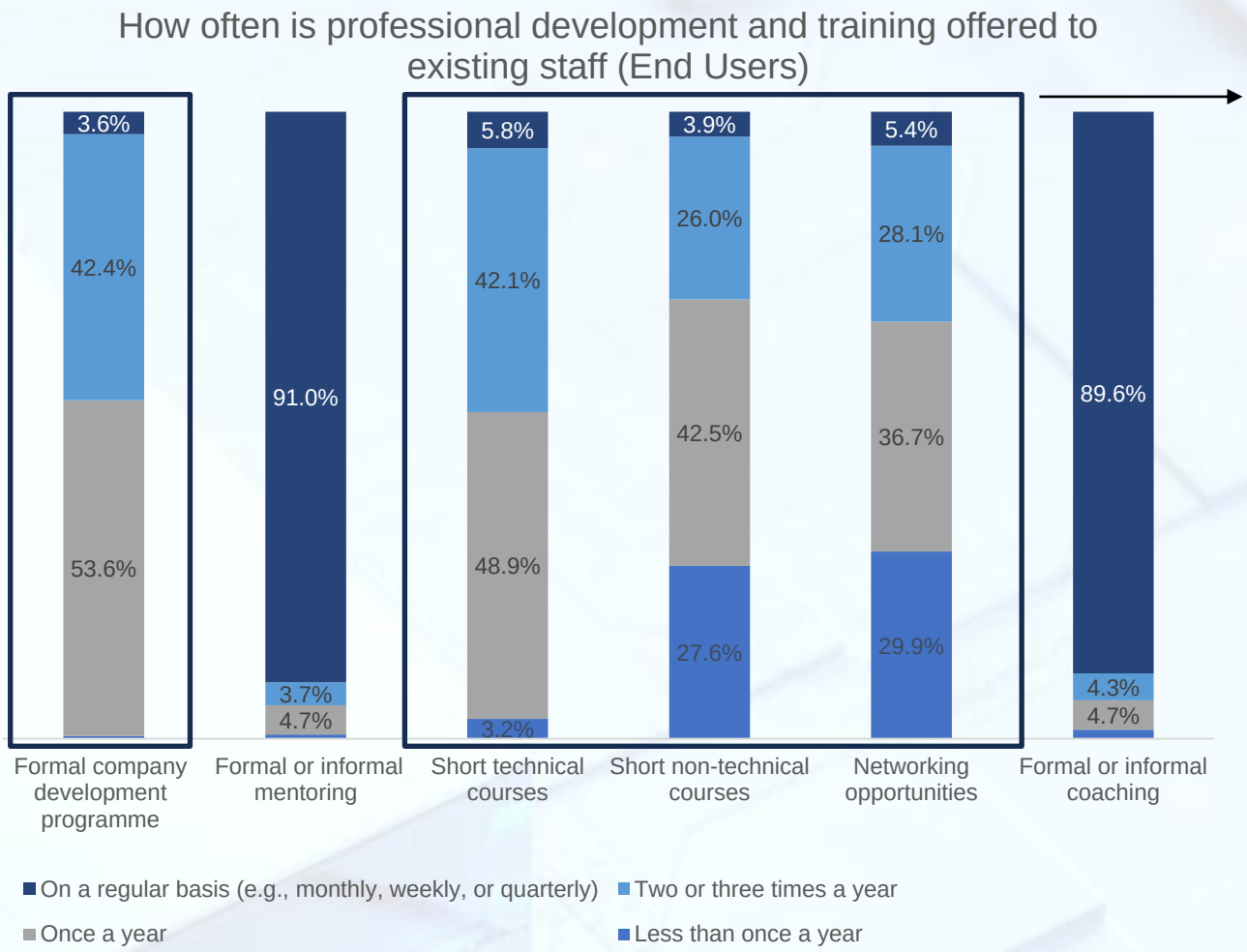
Learning & Development Efforts

How often are semiconductor companies delivering training?

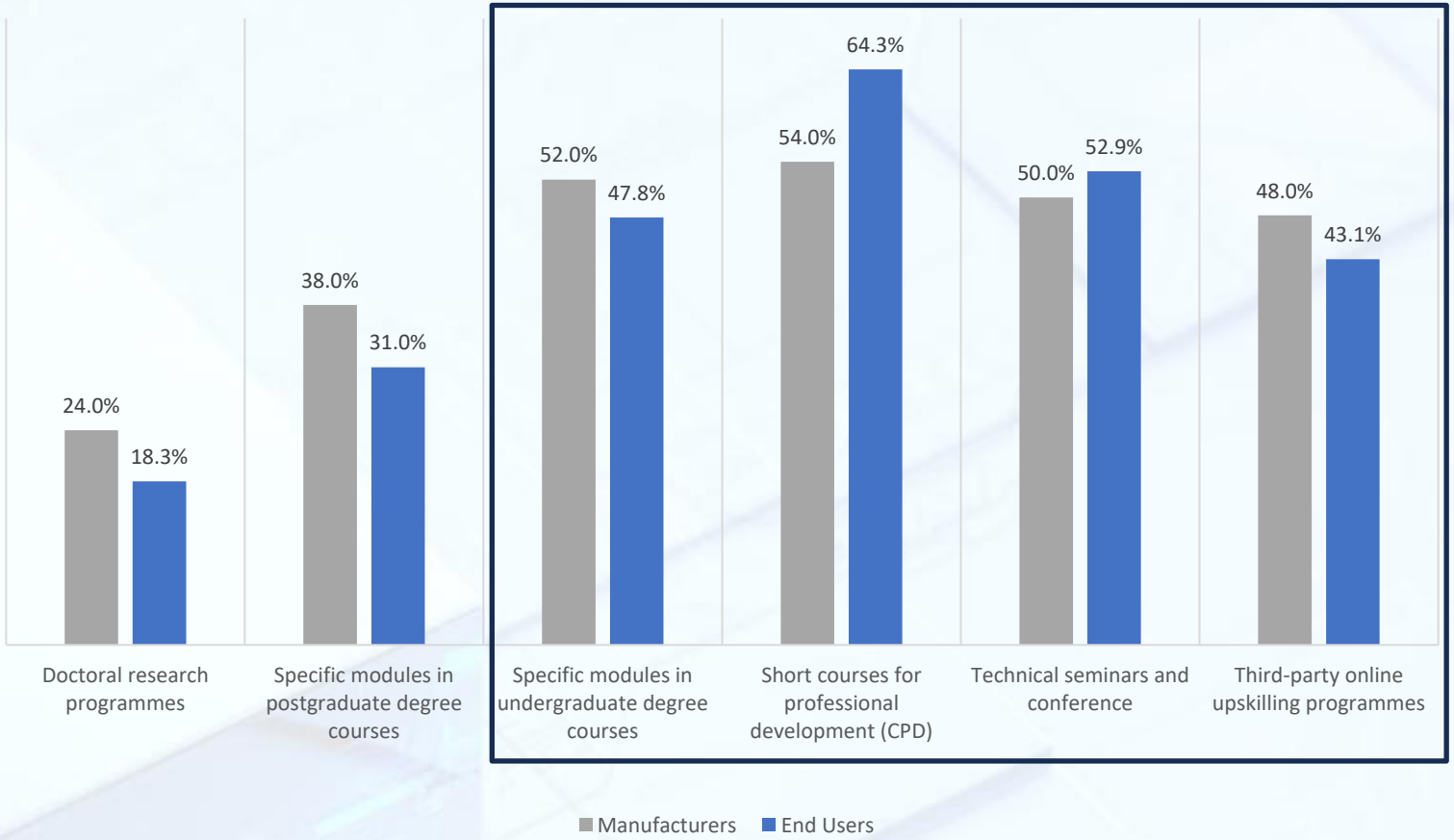


Most of the training offered by end user companies of semiconductors occur less than once per quarter.

Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, FINAL DATA, September 2023

Needs for semiconductor-related growth

Which of the following would you say your company will need over the next 5 years to support its semiconductor-related skills growth?



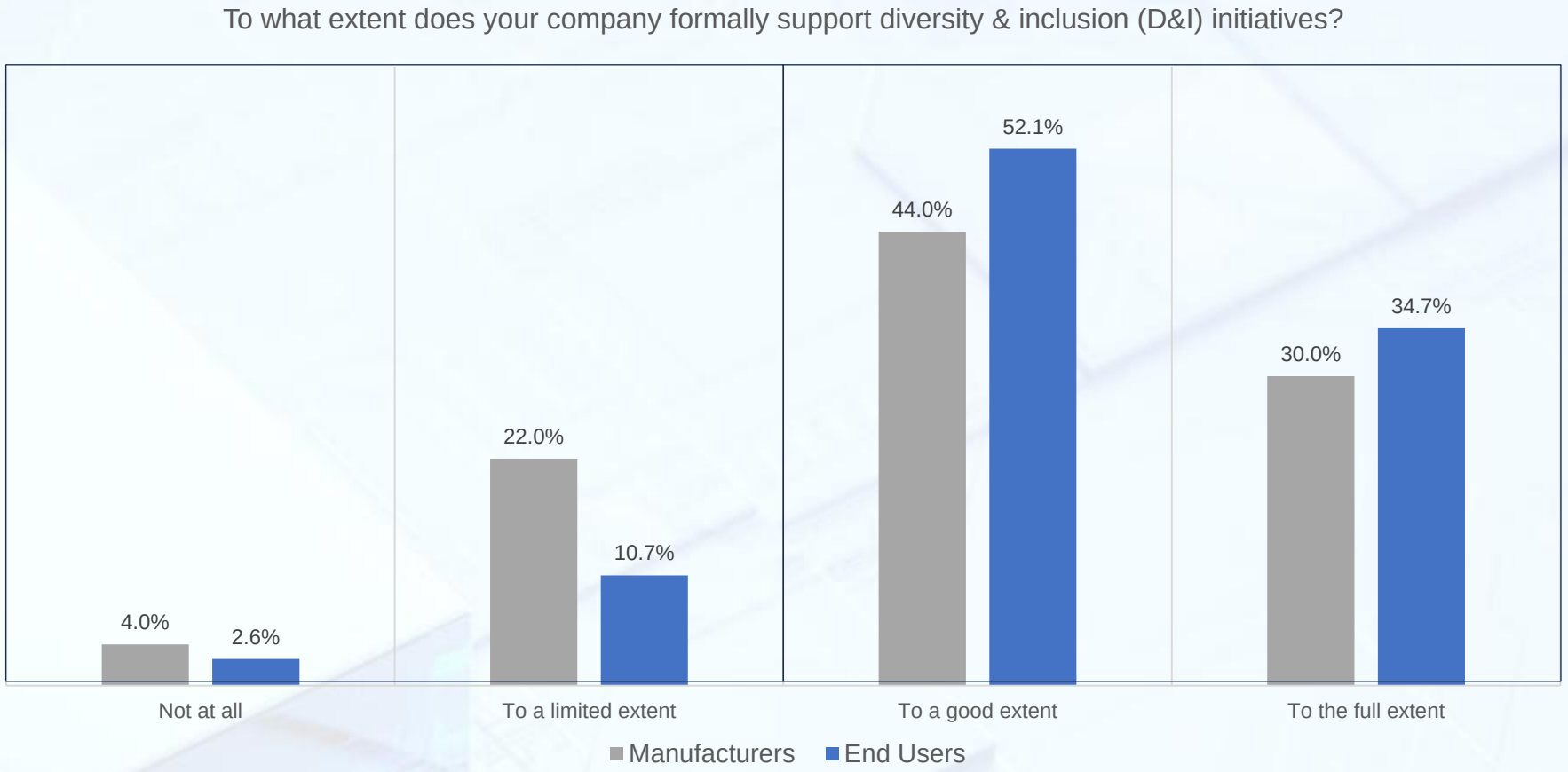
Despite the shortage of skills, most companies are not planning to increase their Learning & Development budgets over the next 12 months

Both Manufacturers and end users are betting on short courses courses for professional development (CPDs), technical seminars, specific modules in undergrad courses and third party online upskilling programs as ways to upskilling over the next years.

However, it seems **manufacturers have a higher propensity in investing in postgrad and doctoral research programs** vs end-user companies.

Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, FINAL DATA, September 2023

Diversity and inclusion support



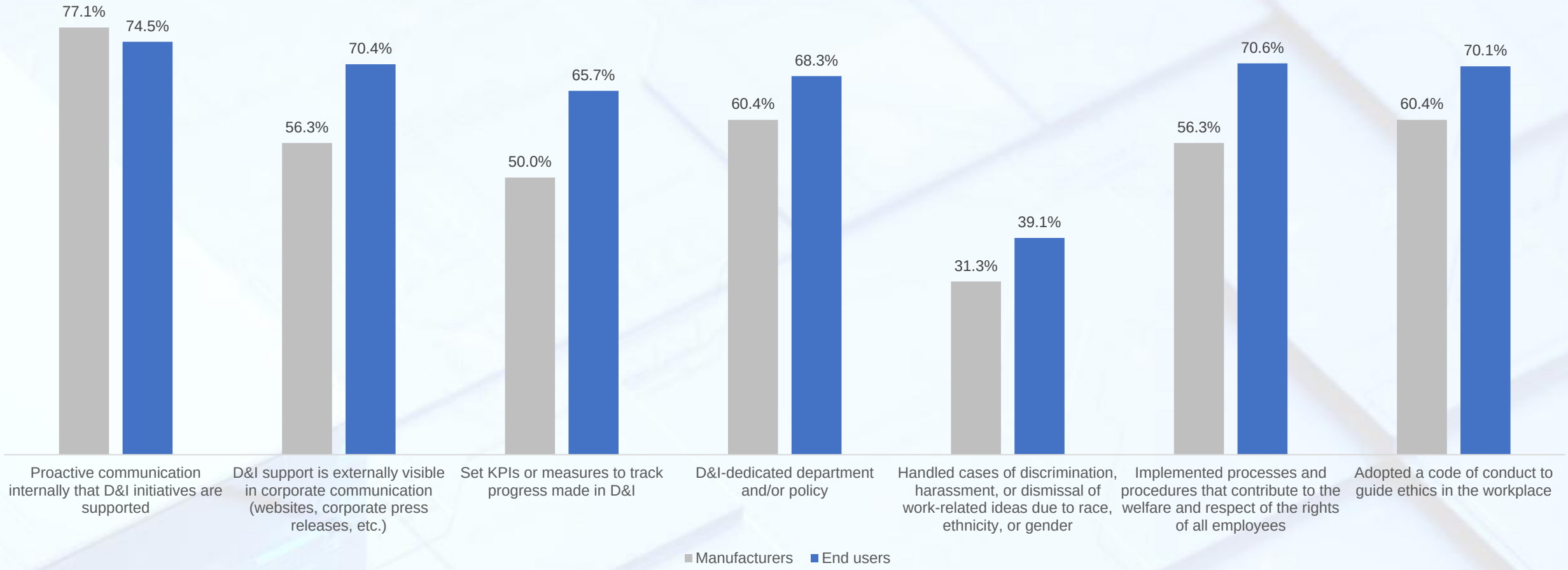
In the lower end of the graph manufacturers represent 66% of the total data, while in the higher end, end users account for 53%.

This indicates that end users have a slight lead in initiatives supporting diversity and inclusion.

Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, INTERIM SL DATA, August 2023

Diversity and inclusion initiatives

Please answer each of the following questions related to your company's support of D&I initiatives (Yes/no) – Yes only



Source: IDC Europe, Semiconductors Skills – Manufacturers (N=50) and end users Survey (N=580), EC, FINAL DATA, September 2023

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Summary of findings

Summary of findings

- The skills shortage is a reality for both manufacturers and end users in semiconductors.
- The talent pool in the area is smaller than needed
- When it comes to looking for workers, both sides are fishing from the same pond

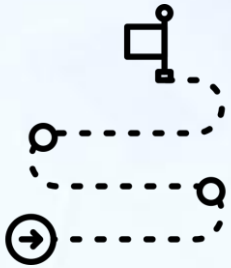
- End users still heavily rely on semiconductor manufacturers to develop, produce and deploy finalized product.
- End user companies are in early stages of establishing semiconductor value-adding departments beyond procurement and installation.

- Most end user companies and hald of manufacturers claimed not to have dedicated internships/work placements for semiconductors
- Training is still relatively unstructured and mentoring practices are not being leveraged
- Frequency of training is still lower than ideal

- Beyond technical skills, Business/soft skills are of high importance for the semiconductor industry
- Communication, problem solving, project management and ability to work independently were the highest ranked attributes.
- Given the high reliance on workers with a STEM background, such soft skills may need to be developed further at work within the semiconductor value chain.

Corrective actions for the semiconductor industry

Invest to increase visibility and attractiveness of the semiconductor industry



Think ahead and carefully plan learning & development efforts, especially onboarding

Create a Learning Culture that Empowers and Gives Purpose to Your Staff

Get closer to Higher Education for knowledge exchanges and internships

Think beyond technical skills

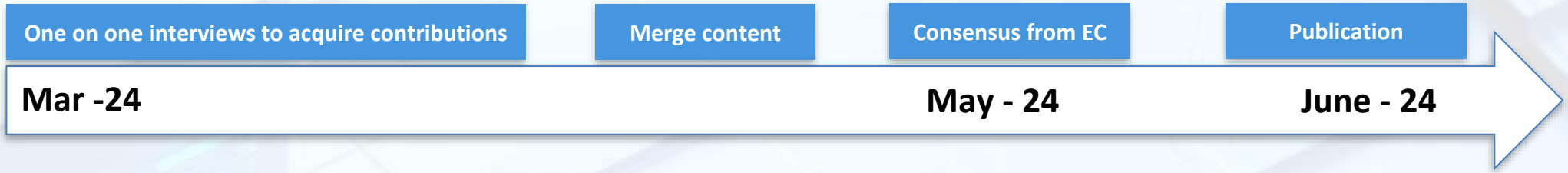
Play Your Part and exchange with the industry ecosystem

Thematic Working Groups on Skills – The Blueprint

Delivery of a Blueprint report with **recommendations**, **guidelines** and **lessons learned** to help influence the **decision of governments** on bridging the gap on skills in the semiconductor sector

1. **Introduction**
   This section introduces the focus of the report and the methodology used.
2. **Analysis of Needs and Current Corrective Actions**
   This section explores the perspectives of various stakeholders, including industry, education, and government. Additionally, it evaluates ongoing initiatives and programs aimed at addressing the identified needs.
3. **Strategies for Addressing Skills Shortages**
   This section explores methods for enhancing STEM education and outreach, developing the workforce through reskilling initiatives, and recommends policy measures.
4. **Case Studies**
   This section features real-world examples of successful initiatives and partnerships. Case studies include instances of effective collaborations between industry and education, national strategies employed by Member States, and innovative approaches to training and development by companies.
5. **Future Outlook**
   This section introduces emerging skills requirements, technological trends, and the influence of automation and AI on workforce demands. Additionally, it explores the role of sustainability and green technologies in shaping the industry's future.
6. **Conclusion**

Request for online contributions



Future commitments

- 3 Main Areas:
  1. **“Awareness campaigns" around bridging the skills gap**
     - **Set up dedicated spaces or stands at major tech and educational events** (such as Maker Faires, which occur globally)
     - **Collaborations with influencers in STEM, education, and technology**
     - **Social media campaigns**, engage with influencers to target the younger audience
  2. **Sponsorship, financial or in-kind support to future Summer Schools**
     - Edu4Chip and RESCHIP4EU (May 2024) Summer Schools organisation
     - ECSA Student Ambassador programme
       - Questions: Which summer schools & how - Solution: Set up a calendar of events, needs to support to the Summer School ?
       - Could the competence centres get involved?
  3. **Scouting & providing valued tutors for reskilling and lifelong learning opportunities**
     - Need for a larger initiative at EU level in order to create a federated approach between Universities
     - Edu4Chip and RESCHIP4EU (May 2024) Master programmes alignment with several partner universities + LiveLongLearning courses for reskilling
     - Part-time professors concept from Industry to universities
     - …..

This project has received funding from the European Union's Horizon Europe research and innovation programme under GA N° 101092562