ChemSkills

Enabling the green and digital skills transformation of the chemical industry.

Report on ChemSkills Survey Results

2nd iteration in Rubber sector

October 2025

Co-funded by the European Union

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Executive Summary

This survey received 37 responses, representing all stakeholders in the rubber sector and its heterogeneity in terms of activities across the value chain and organizational size. These responses came from companies (50%), education and training providers (17%), research and development centres (17%), public institutions and authorities (14%), and industry associations (2%). The respondent organizations are based in 15 EU countries and one non-EU country (Argentina). However, some geographical bias may have been introduced as the majority of responses came from organizations operating in Spain and the Netherlands.

The main drivers of change in the upcoming green and digital transition of the rubber sector are undoubtedly related to sustainability, circularity, and the use of non-polluting, safe and energy-efficient materials, products and technologies. Secondly, regulatory changes (including excessive regulation and bureaucracy) and security and ethics are emerging as important drivers of change in this sector, even surpassing trends related to the digital transition, such as AI, data analysis, and automation.

This survey identified a total of 20 new job roles needed to address the challenges of the green and digital transition in the rubber sector. The need for sustainable materials engineers appears to be the most widely recognized new role in the rubber sector. Other new roles deemed necessary to face the green and digital transition include data engineers (and data scientists), AI research scientists, automation and robotics engineers, sustainable design engineers, life cycle assessment analysts, and safety compliance analysts.

According to the survey results, the production department has the largest expertise gap in green and digital skills, followed by the maintenance and research and development departments. These results complement the information obtained in the first survey, in which it was recognized that professionals and technicians are currently the most needed workforce in the rubber sector to face the green and digital transition. Accordingly, they should be the target audience for upcoming training courses.

Regarding the preferred training formats in the rubber sector, it is clear that in-house training is favoured over external training, and that in-person or online training is favoured over blended learning, which combines both formats.

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1. Identification of Respondents

A total of **37 responses** were received to the ChemSkills survey, from companies (50%), education and training providers (17%), research and development centres (17%), public institutions and authorities (14%), and industry associations (2%). These responses represent all stakeholders in the rubber sector's value chain (see Figure 1) divided in 7 different sub-sectors (see Figure 2):

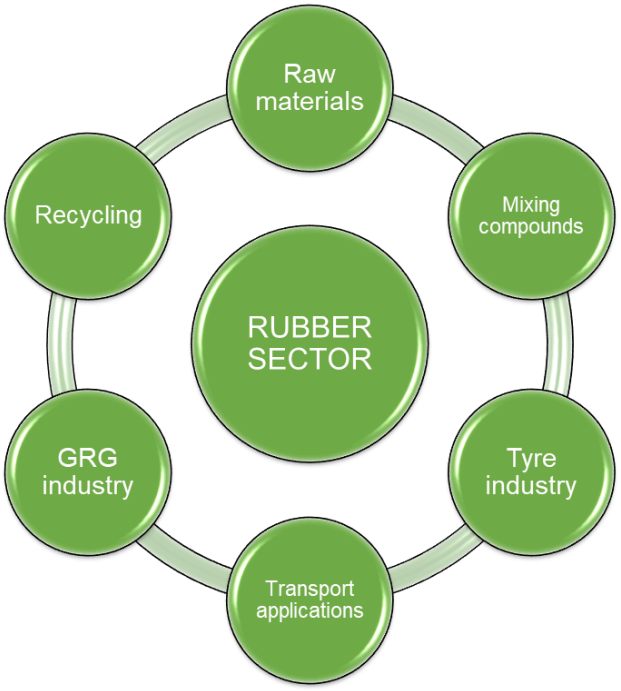

Figure 1. Identification of the main industrial stakeholders that define the value chain in of the rubber sector.

- **Raw material suppliers**: This includes suppliers of rubber (both natural and synthetic), as well as providers of all the other ingredients required in the rubber sector, e.g., fillers, processing oils and plasticisers, vulcanization agents, anti-ageing products, etc. In this survey, they accounted for **11% of the total responses** received in the rubber sector. A deeper analysis of these organisations reveals that 50% of them were large organisations with more than 250 employees, while the remaining responses came from medium-sized companies with 50–250 employees (25%) and micro-sized companies with fewer than 10 employees (25%).

- **Rubber mixer and compounder**: These are the companies that mix the ingredients for different rubber compounds, which manufacturers then use to produce different rubber products. Responses from these companies represent **27% of the rubber sector's total responses**, coming from large (50%), medium (10%) and small (40%) organisations.

- **Tyre industry**: Tyres are the most important rubber product. Responses from organizations in the tyre sector represent **22% of all responses received**. Most of the participating organisations were large companies (63%), but small education and training providers and research groups related to the tyre industry also participated in the survey (37%).

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- **Rubber for transport applications:** Participants in this survey included large (60%) and medium (40%) companies that produce rubber products for use in the automotive, rail and aerospace industries. These companies provided **14% of the responses from the rubber sector**.

- **General rubber goods (GRG) industry:** These are companies that produce rubber goods for the construction, mining, household appliances and energy industries, excluding those related to rubber products for transport applications. Responses from this sector represented **27% of the total rubber sector responses**, coming from large (50%), medium (20%) and small (30%) organisations.

- **Rubber recycling:** This includes waste managers and recyclers of tyres and GRG. In this survey, they accounted for **19% of the total responses** received in the rubber sector, being represented by large (42%), medium (29%) and small (29%) organisations.

- **Other:** This category includes 6 responses from **research and development centres**, 1 **education and training provider**, 1 **industry association**, 1 **consultant**, 1 **converter** and 1 small organization dedicated to the design, manufacture and sale of rubber compounds and vulcanized rubber articles.

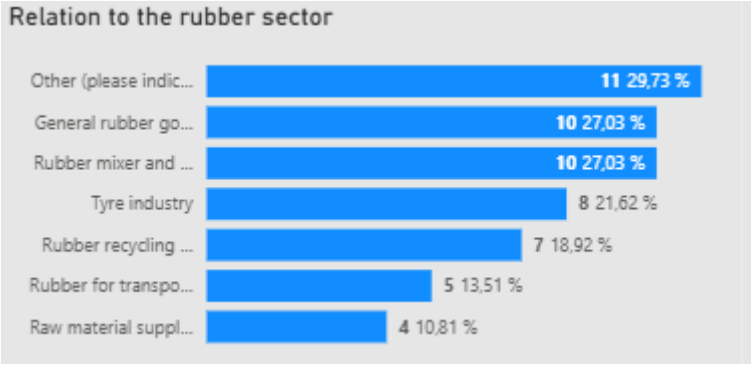

Figure 2. Identification of the respondents and their relation to the rubber sector.

Finally, this survey enables us to identify **heterogeneity among stakeholders in the rubber sector** in terms of **activity diversity** across the value chain (Figure 2) and **organisational size**. Figure 3 shows that 41% of respondents were from large organisations with more than 250 employees, 32% were from small organisations with 10–49 employees, 22% were from medium-sized organisations with 50–249 employees, and 5% were from micro-organisations.

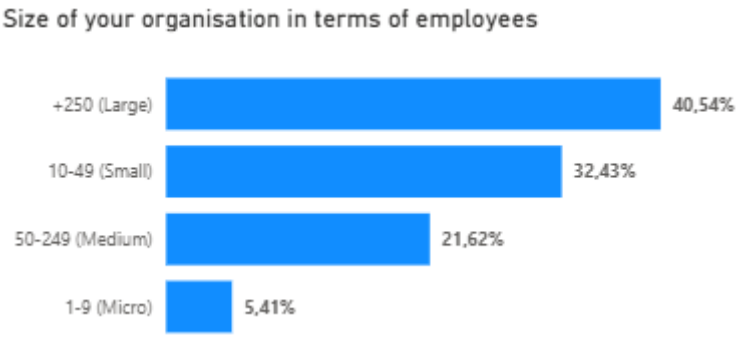

Figure 3. Classification of the respondents by the size of its organisation.

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Although the respondent organizations cover 15 EU countries and one non-EU country (Argentina), it is important to note that the majority of the responses came from organizations operating in Spain and the Netherlands (see Figure 4). This could introduce a local bias to the information obtained through the survey.

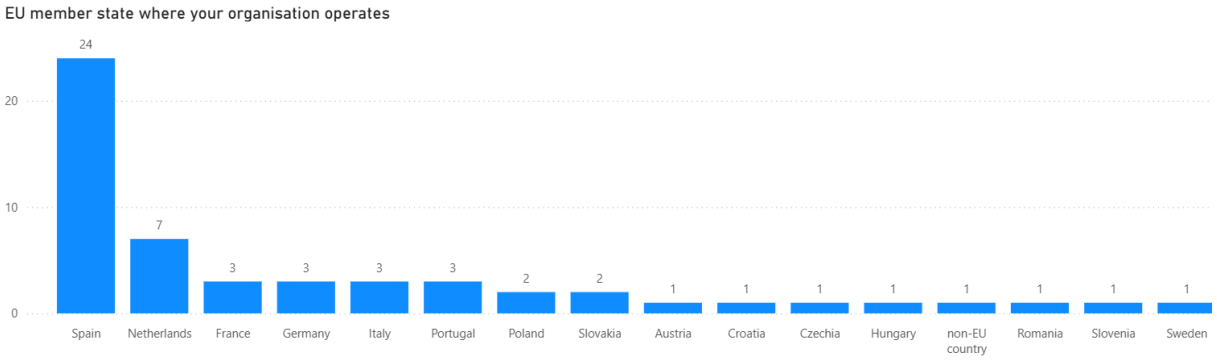

Figure 4. Place of operation of the respondents.

2. General Trends and Competences

The main drivers of change in the upcoming green and digital transition of the rubber sector are undoubtedly related to green transition according to the results summarized in Figure 5. In this context, sustainability, circularity, and the use of non-polluting, safe and energy-efficient materials, products and technologies are identified as the most important trends. Secondly, regulatory changes (including excessive regulation and bureaucracy), security and ethics are emerging as important drivers of change in this sector, even surpassing trends related to the digital transition, such as AI, data analysis, and automation. There is not relevant variation in the identified sectoral trends neither their importance in the rubber sector according to the organisation size.

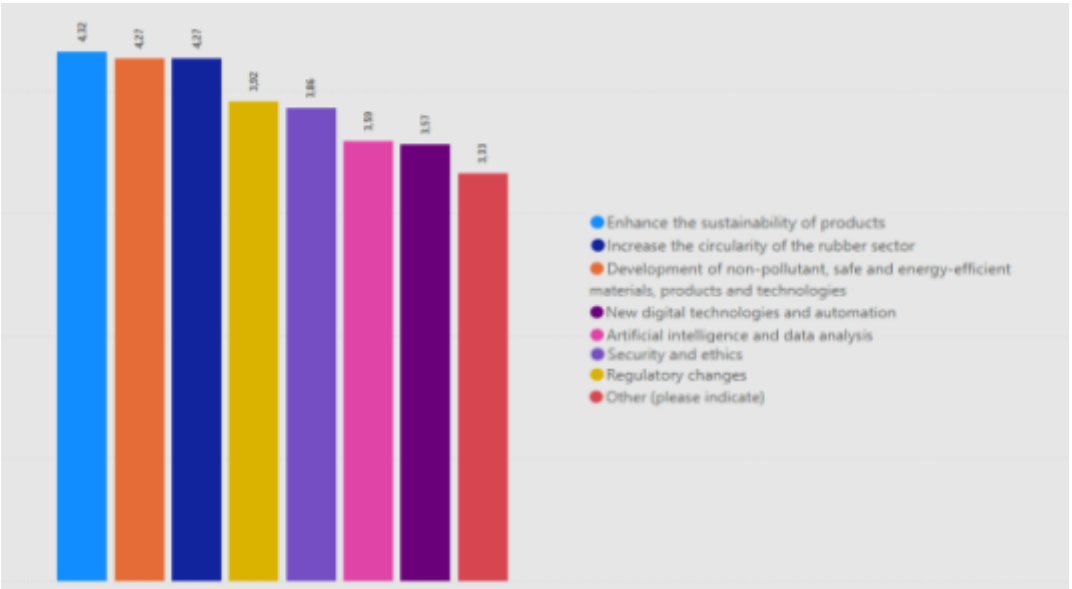

Figure 5. Current trends/drivers of change in the upcoming green and digital transition

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3. Green Transition

3.1. Trends and Competences

According to the results obtained in the survey, the green trends and competences in the rubber sector shall be divided in three main mega-trends:

3.1.1. Sustainability

The most important identified trends in the field of rubber sustainability are the development of **sustainable by-design rubber materials** and the **synthesis of polymers and ingredients from renewable and recycled feedstocks**, followed by the **evaluation of life cycle assessment** of products and processes and the application of **green chemistry** principles (see Figure 6). However, the importance of the latter trend depends on organisation size, with it being considered less important in large organisations.

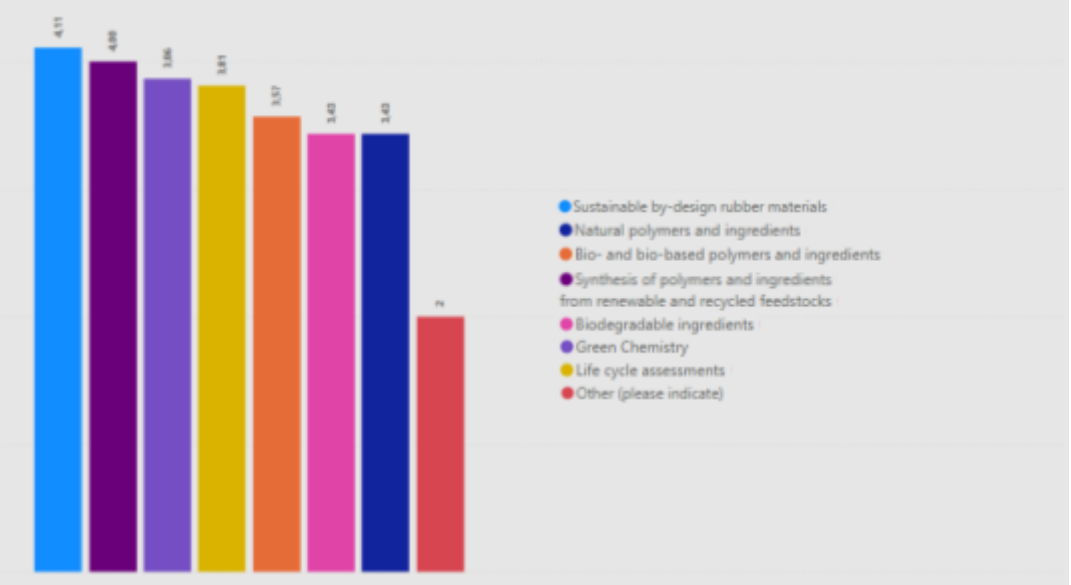

Figure 6. Current trends/drivers of change in the field of rubber sustainability.

3.1.2. Circularity

The circularity of the rubber sector would improve based on five main trends: **eco-design**, the **extension in the lifetime** of rubber products, the **management of end-of-life rubber products**, the **rubber recycling** and finally, the **application of recycled raw materials in rubber compounds** (see Figure 7). It is interesting to point out that for medium and small organisations the regulatory aspect of waste management also emerges on the top three trends for improving the circularity of this sector.

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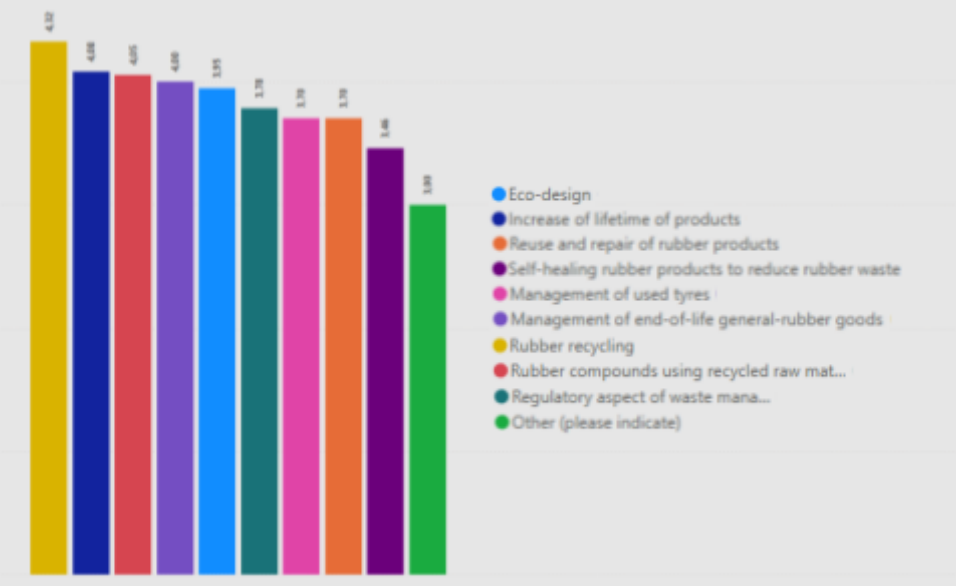

Figure 7. Current trends/drivers of change in the field of rubber circularity.

3.1.3. Non-pollutant, safe and energy-efficient materials, products and technologies

Minimize or substitute pollutants and hazardous chemicals in rubber products and **minimize the impact of rubber industry on the environment and human health** are two main drivers in this important topic according to answers summarized in Figure 8.

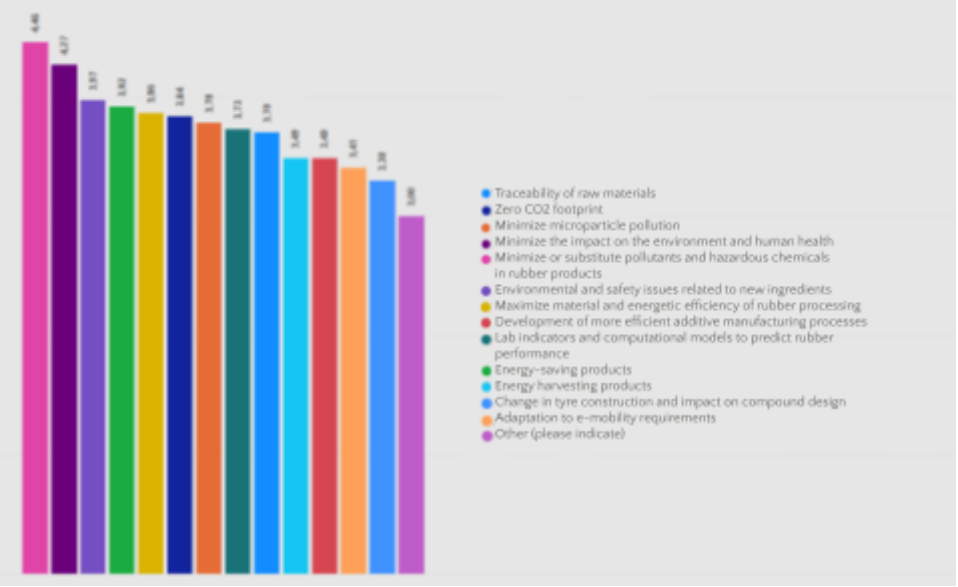

Figure 7. Current trends/drivers of change in the field of non-pollutant, safe and energy-efficient materials, products and technologies.

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3.2. New Jobs

In this survey, a total of 10 different jobs were proposed in order to evaluate their importance to face the green transition challenges:

- Sustainable design engineer
- Sustainable material engineer
- Sustainability analyst
- Advanced processing engineer
- Waste management officer
- Solid waste operator
- Recycling worker
- Safety compliance analyst
- Environmental engineer
- Life Cycle Assessment analyst

No alternative new job roles were proposed by the organizations that responded to this survey. While all of the proposed roles were deemed necessary in order to prepare for the upcoming green transition, the need for **sustainable materials engineers** appears to be the most widely recognized in the rubber sector (see Figure 8). Additionally, the importance given to other new roles, such as sustainable design engineers, life cycle assessment analysts and safety compliance analysts, highlights the importance of trends that were discussed in previous sections, such as the eco-design of rubber materials to improve their sustainability and recyclability, the use of safe, non-polluting materials, and the compliance with current regulations, as well as the analysis of life cycle for rubber materials and processes. Finally, all new roles related to rubber recycling seem to receive lower support.

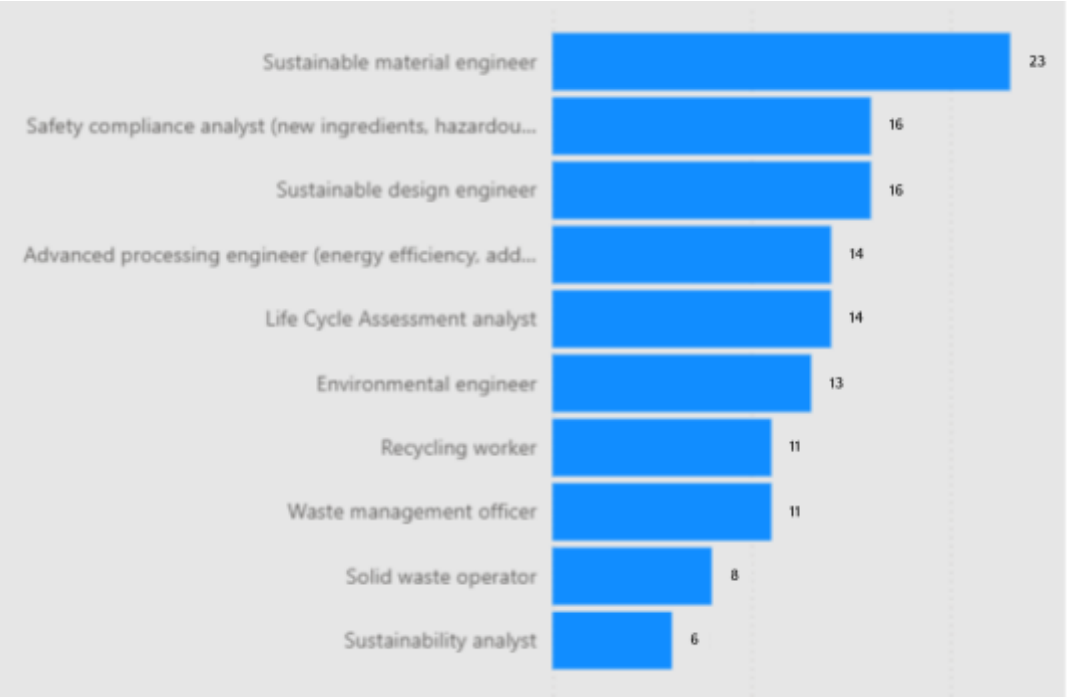

Figure 8. New jobs needed to face the green transition challenges

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3.3. Sectoral Gaps Related to Green Skills

The survey included a section to gather information about the departments where there is a more significant lack of expertise in green competencies. While all of the proposed departments seem to have deficiencies in green skills and competencies, according to the answers received in the second run of this survey it is possible to identify that **production** is the department with the largest gap of expertise in this field (see Figure 9). Other relevant departments with deficiencies in green competences are IT/digital, maintenance, and research and development.

These results complement the information obtained in the first run of the survey where professionals and technicians were recognized as the workforce that is currently more needed in the rubber sector to face the green and digital transition, which as a result should be the target for the upcoming training courses.

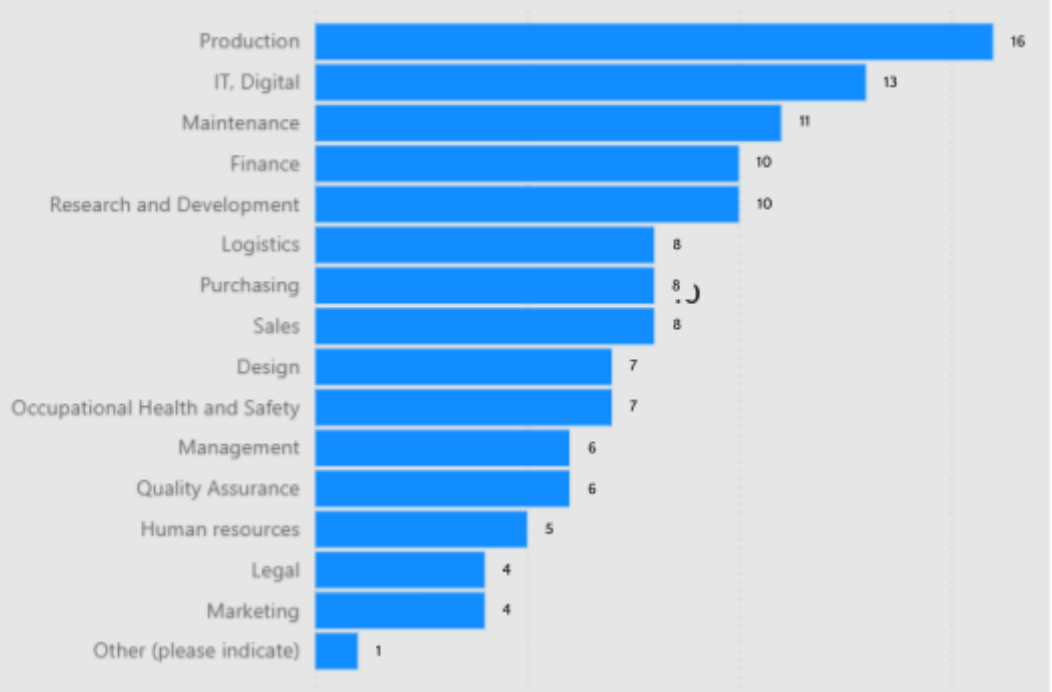

Figure 9. Departments with a more significant lack of expertise in green competences

4. Digital Transition

4.1. Trends and Competences

According to the results obtained in the survey, the digital trends and competences in the rubber sector shall be divided in three main mega-trends, named **new technologies and automation, AI and data analysis and security and ethics**. It is important to mention that all the digital trends were ranked with slightly lower scores (lower importance) than green trends, except those related with **security and ethics, that seems to be the more important**

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issue in the digital transition, with special attention to cybersecurity, data protection and privacy (see Figure 10).

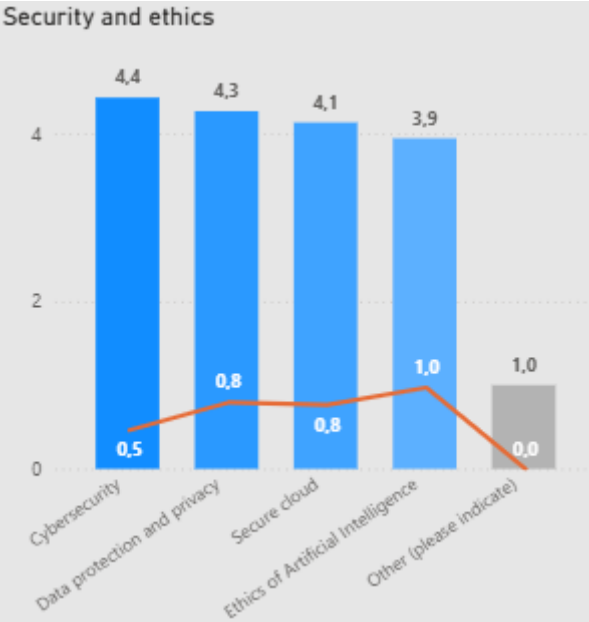

Figure 10. Current trends/drivers of change in the field of security and ethics

Outside the tends related to security and ethics, **simulation and computer design tools for the design of rubber products, development of predictive models, sensoring on rubber products and processes** and **data analytics** are the most relevant identified trends for facing the digital transition challenges of the rubber sector (see Figure 11 and 12).

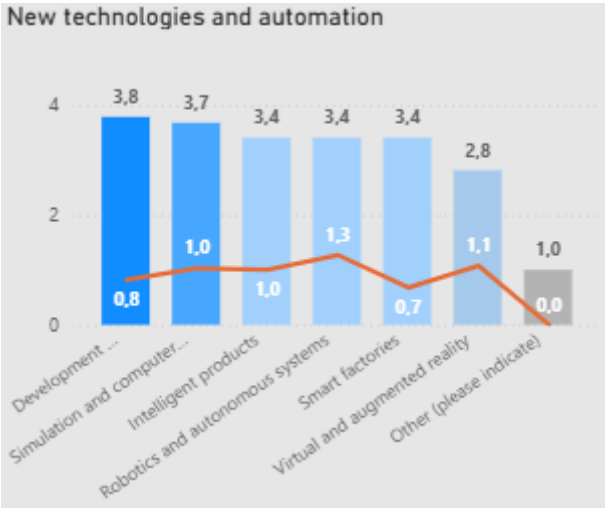

Figure 11. Current trends/drivers of change in the field of new technologies and automation

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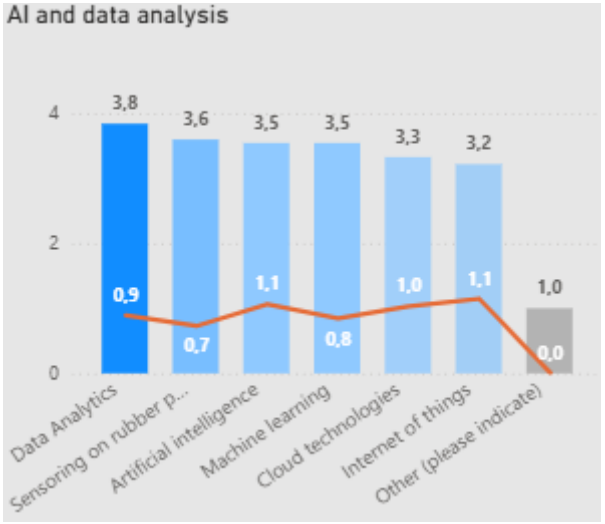

Figure 12. Current trends/drivers of change in the field of AI and data analysis

4.2. New Jobs

In this survey, a total of 10 different jobs were proposed in order to evaluate their importance to face the digital transition challenges in the rubber sector:

- Sensoring systems engineer
- Automation and robotics engineer
- Data engineer
- Database designer
- Data scientist
- ICT system developer
- AI research scientist
- Business consultant
- Embedded systems security engineer
- AI ethics officer

No alternative new job roles were proposed by the organizations that responded to this survey. While all of the proposed roles were deemed necessary in order to prepare for the upcoming digital transition, the need for data engineers (and data scientist), AI research scientists and automation and robotics engineers appears to be the most widely recognized in the rubber sector (see Figure 13). The importance given to these new roles support the importance of data analytics as a driven force for the digital transition, as discussed in the previous section, meanwhile reinforcing other trends related to AI, machine learning and robotics (and autonomous systems). Finally, it is important to note that the importance of improving the use of sensors in rubber industry is also supported by the need of sensoring systems engineers to face this trend.

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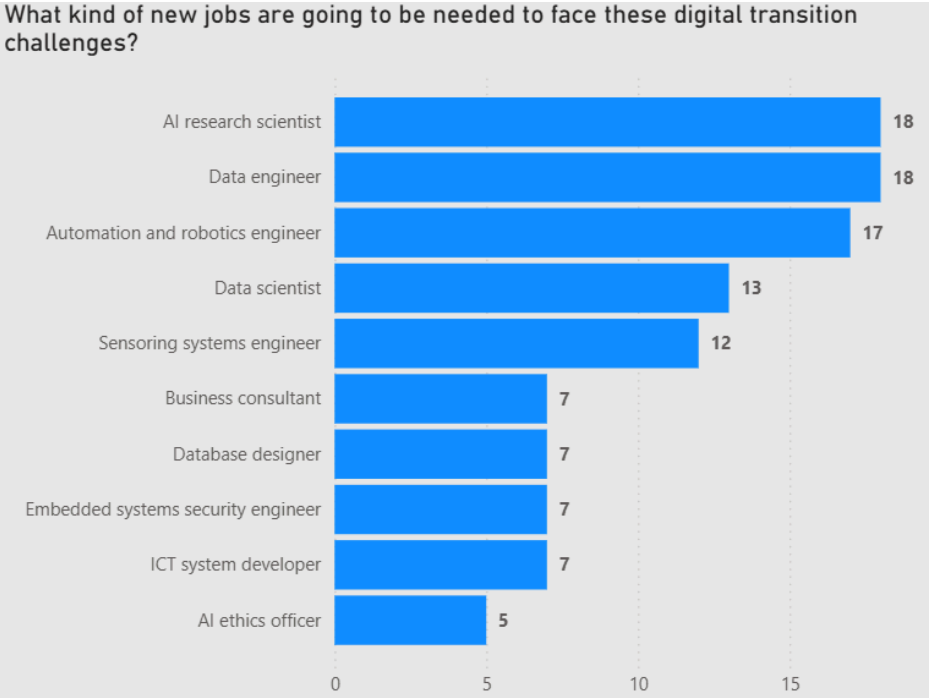

Figure 13. New jobs needed to face the digital transition challenges

4.3. Sectoral Gaps Related to Digital Skills

According to the information gathered from the survey, all of the proposed departments seem to have similar deficiencies in green and digital skills and competencies, making it possible to identify that production is the department with the largest gap of expertise to face this double transition (see Figure 14). Other relevant departments with deficiencies in digital competences are maintenance, and research and development.

These results complement the information obtained in the first run of the survey where professionals and technicians were recognized as the workforce that is currently more needed in the rubber sector to face the green and digital transition, which as a result should be the target for the upcoming training courses.

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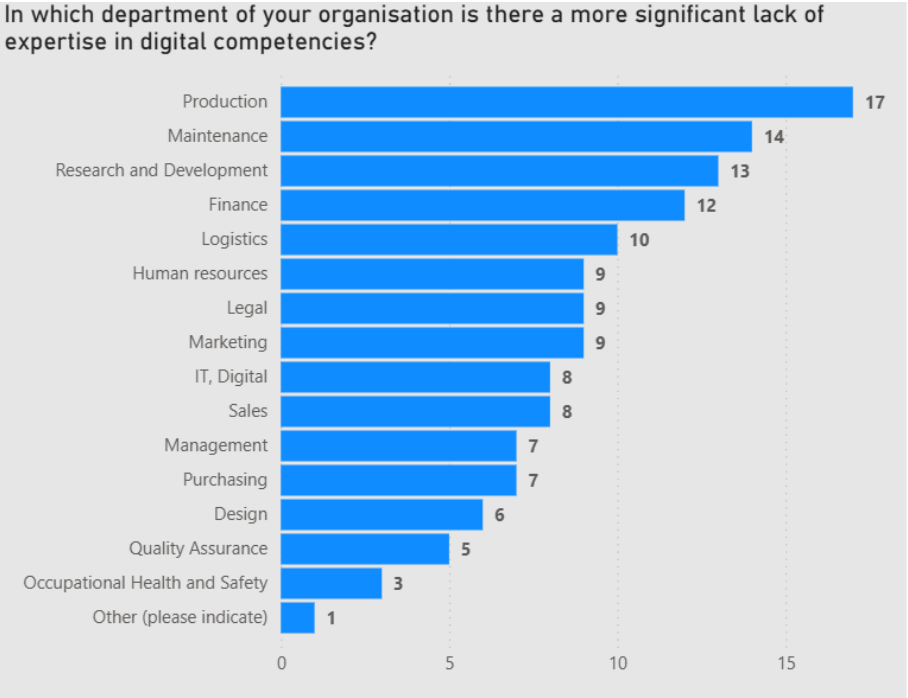

Figure 14. Departments with a more significant lack of expertise in digital competences

5. Training Need in the Transition in Rubber sector

Questions regarding the type of training and courses in the rubber sector, as well as regarding the investment on personal learning and development were made in order to screen what offer is needed for this particular sector in the upcoming green and digital transition.

In terms of training formats, it is clear that in-house is preferred over external trainings, whereas in-person or online trainings are preferred over blended learning, where both formats are combined (see Figure 15).

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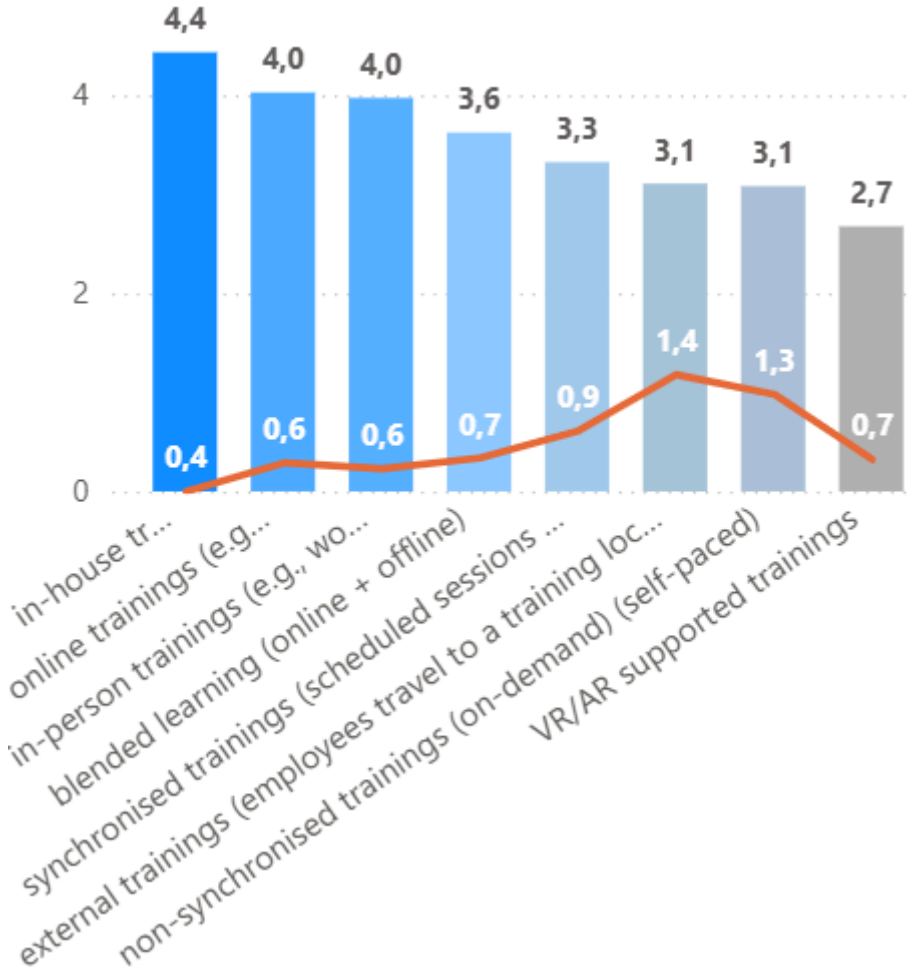

Figure 15. Preferences on the training formats in the rubber sector

Regarding the maximum training time, there is not a clear trend in the organisations that responded to this survey. It seems to not be an issue for training in green and digital skills and competences.

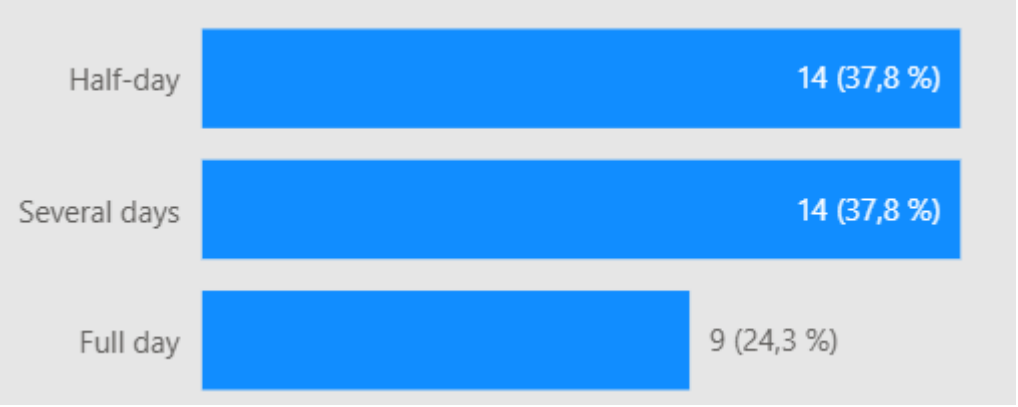

Figure 16. Preferences on the training time in the rubber sector

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