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Project Deliverable Report



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Technical Group: **TGA2**

Mapping, Educating, Training, Applying models in continuous CASTing

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1. INTRODUCTION

As mentioned in the Project Grant Agreement, METACAST, as a RFCS Accompanying Measure, consists of dissemination, awareness-raising, communication, networking, in a common background on modelling, as well as training and learning reinforcement activities as key to maximising its impact at the industrial, environmental, and socio-economic levels.

The ambitious aim of the presented project is to strengthen in all the actors (stakeholders, R&D references, people undergoing a dedicated education up to postdoc level) the awareness of modelling as powerful tool to turn industrial issues into technical problems which can contribute to problem solving and at the same time, to increasing knowledge and improving the management of work processes and places. To boost this action, interaction with the players is fundamental, so their feedback is of major importance to define current status and future trends of modelling.

In this view, this report shows statistics about stakeholders' feedback on modelling use.

2. ACTIVITY PERFORMED

The METACAST survey collected insights from 21 users of continuous casting (CC) modelling tools across European producers, RTOs and technology providers. The respondent pool shows a balanced mix of engineers, researchers, and operational staff, with heterogeneous levels of familiarity and expertise in modelling.

The overall set of questions is shown in Appendix. It was set up in a Microsoft Forms frame and composed of general common questions (e.g. on respondents role and skill) and others well defined and targeted more on a) model users; b) training aspects; c) management position vs modelling as a valuable resource, d) on future trend and expected role of the players. While the findings from b) c) and d) is shown and discussed in separate deliverables, this document refers to model users' feedback.

The figures presented show the results in terms of percentages of respondents. For multi-select questions, percentages are computed as the share of respondents each item over all respondents who answered that question.

Figures 1–3 show roles, familiarity, and self-declared expertise levels, all expressed as percent of respondents.



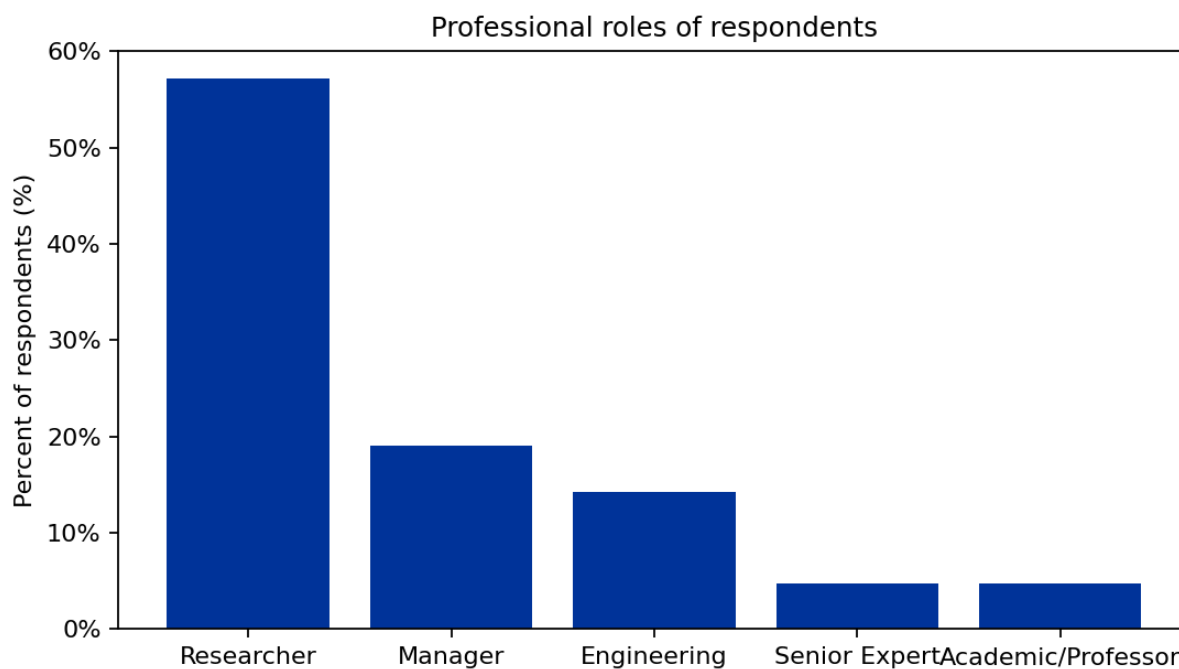


Figure 1 – Professional roles of respondents (%)

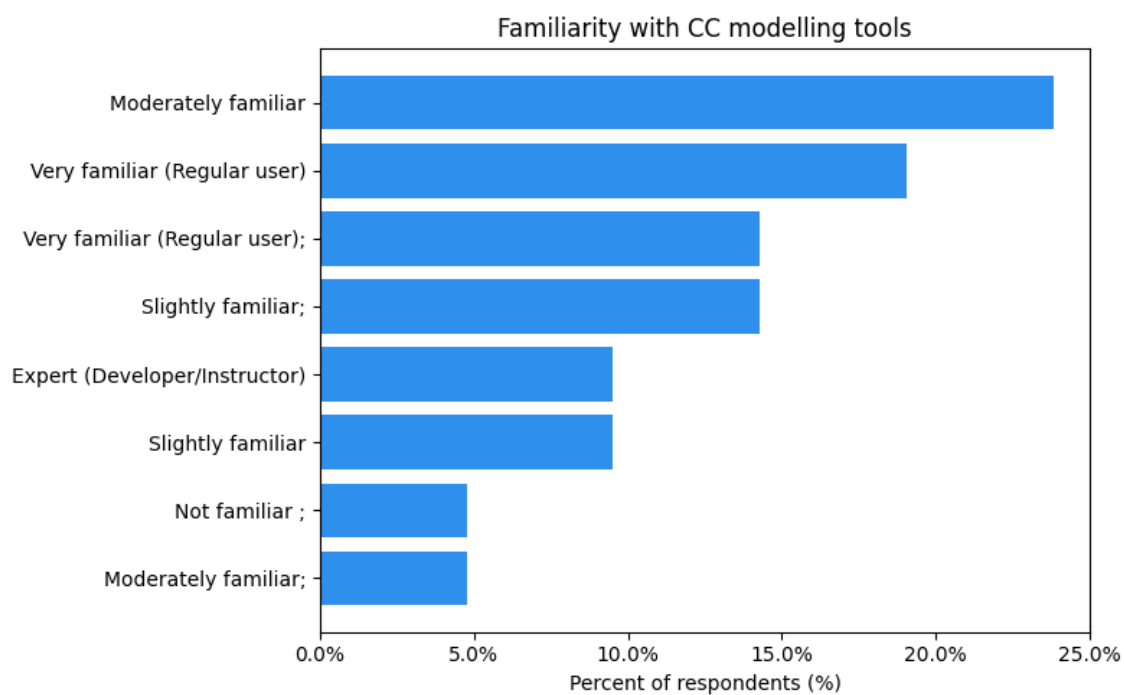


Figure 2 – Familiarity with CC modelling tools (% of respondents)

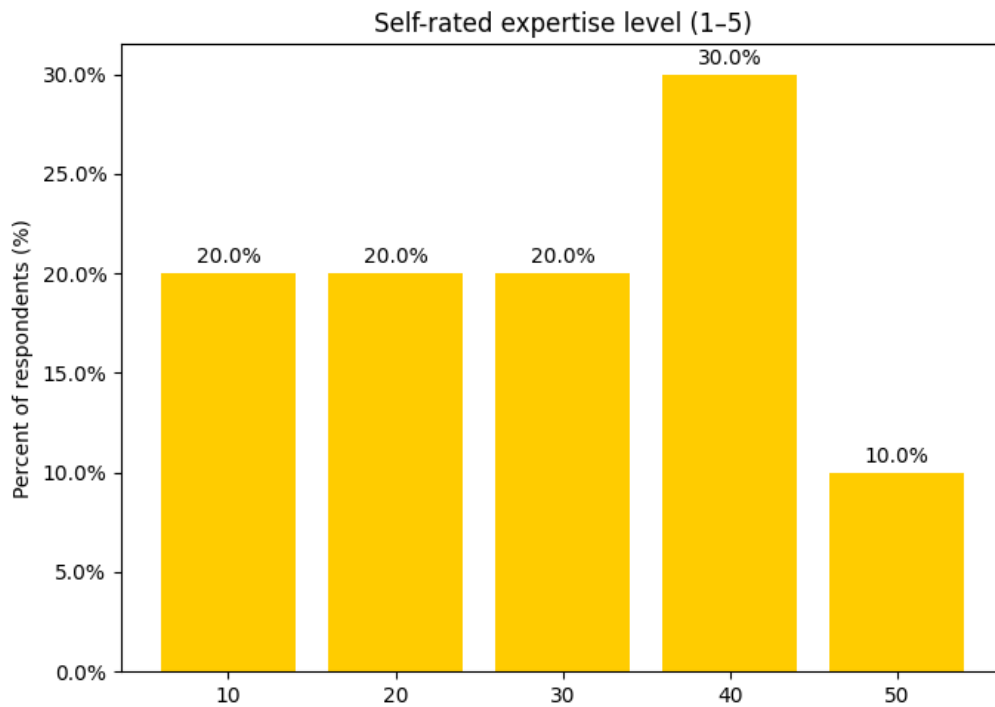


Figure 3 – Self-rated expertise level (1 min–5max) (% of respondents)

How Models Are Used. Figures 4–5 show organisational model-user roles and primary objectives, in percent of respondents.

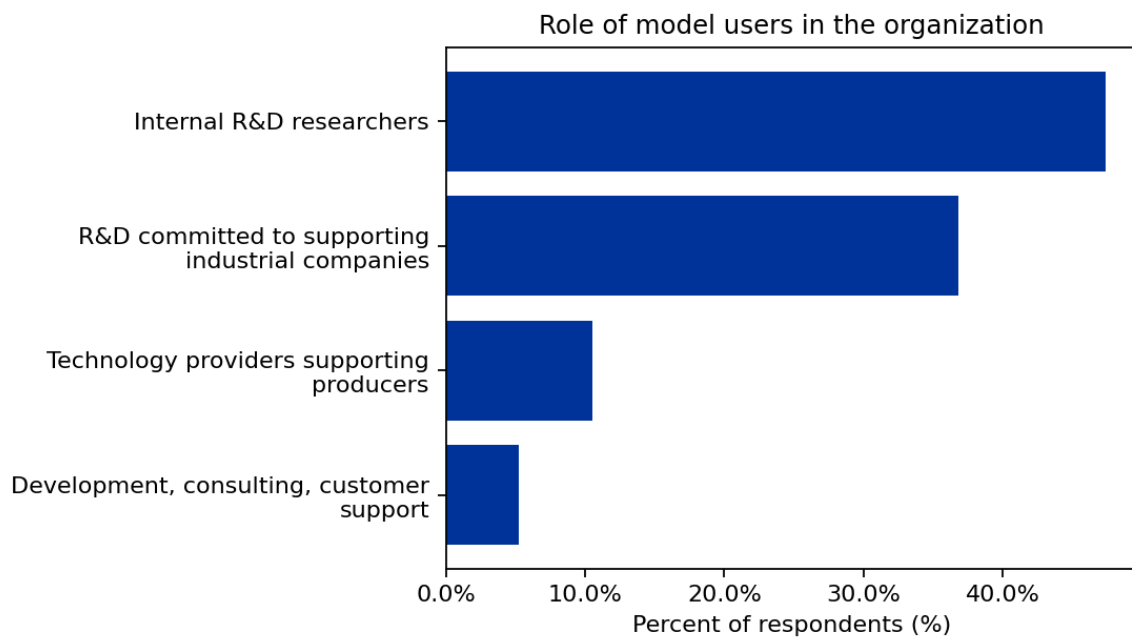


Figure 4 – Role of model users within the organisation (% of respondents)

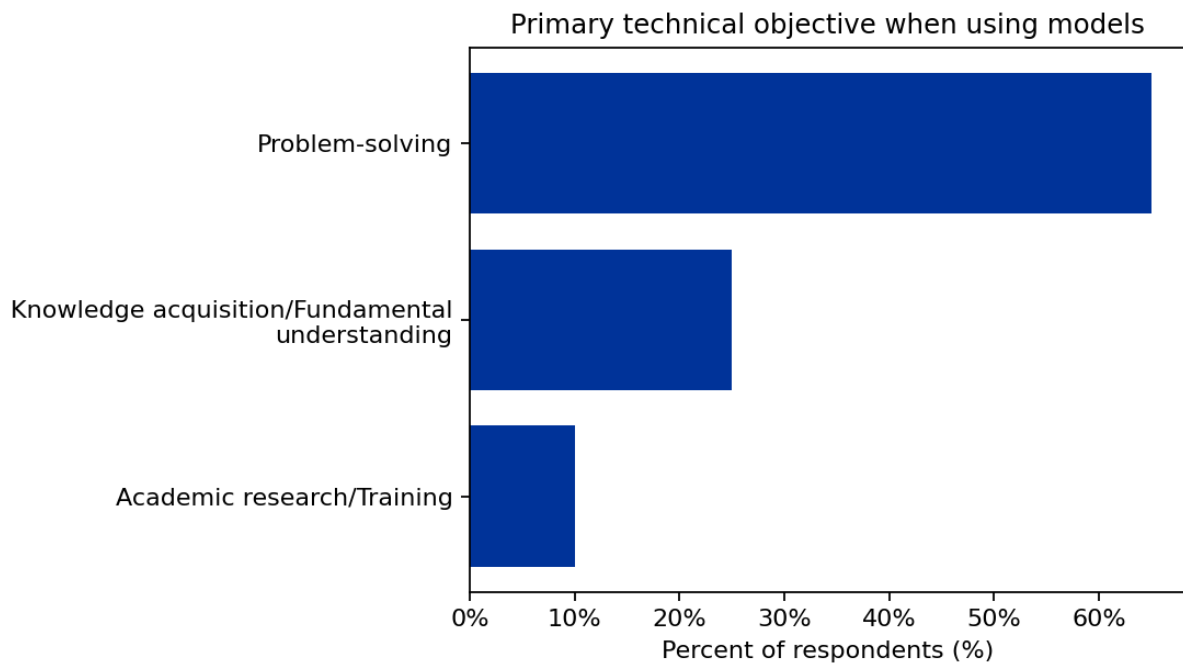


Figure 5 – Primary technical objective when using models (% of respondents)

Figures 6 and 7 show the feedback gained concerning sentiment vs. modelling and user recommendations.

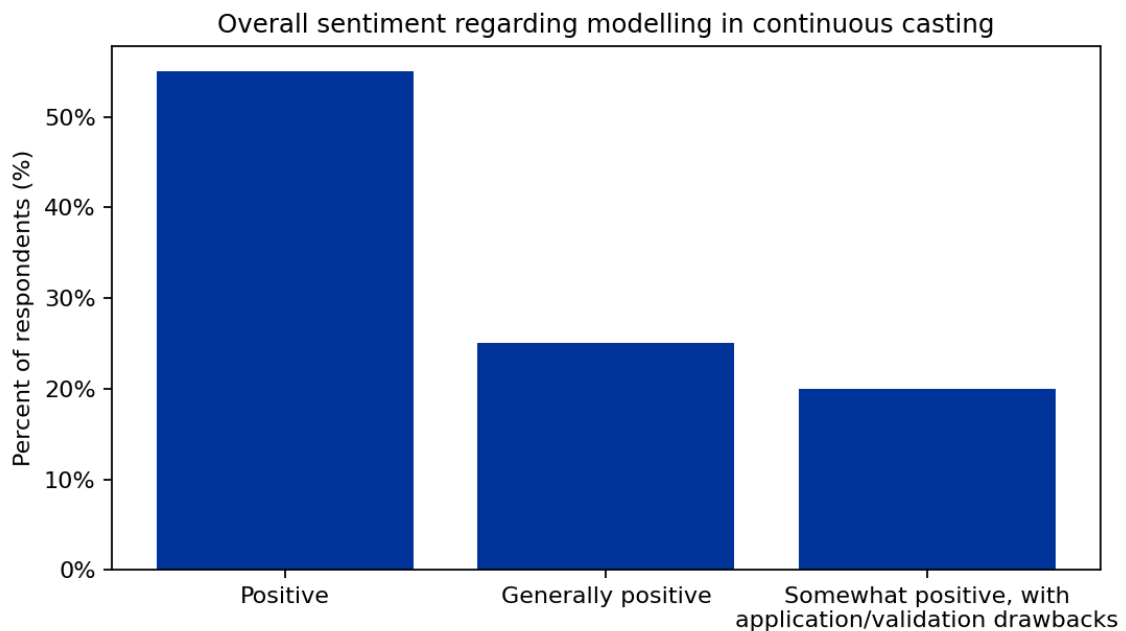


Figure 6 – Overall sentiment regarding modelling in CC (% of respondents)

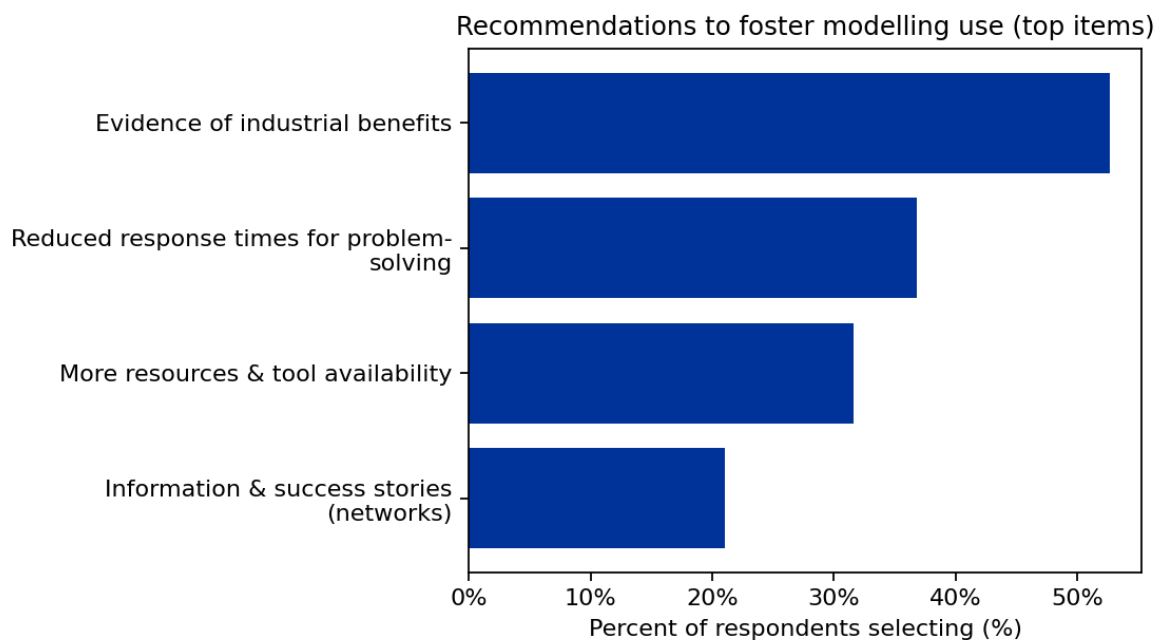


Figure 7 – Recommendations to foster modelling use (top items; % of respondents)

Finally, figures 8, 9 and 10 show respectively the feedback concerning the aspects needing improvement, the resources to boost modelling use, as well as the expected steps forward.

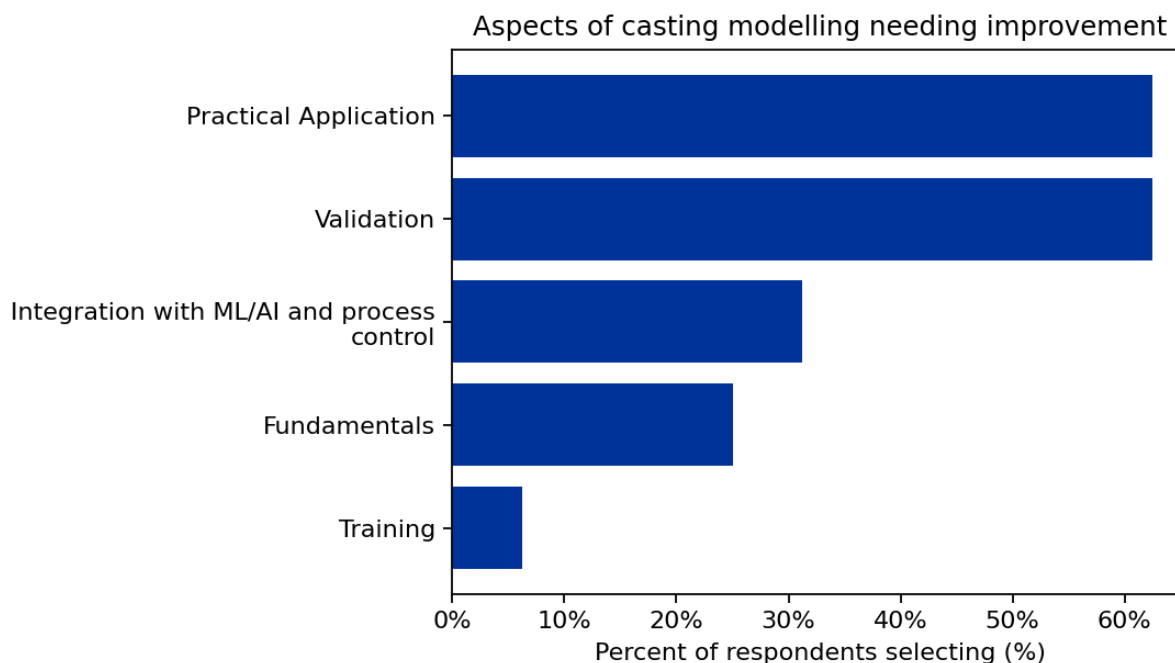


Figure 8 – Aspects of modelling needing improvement (% of respondents)

Resources needed to boost modelling use

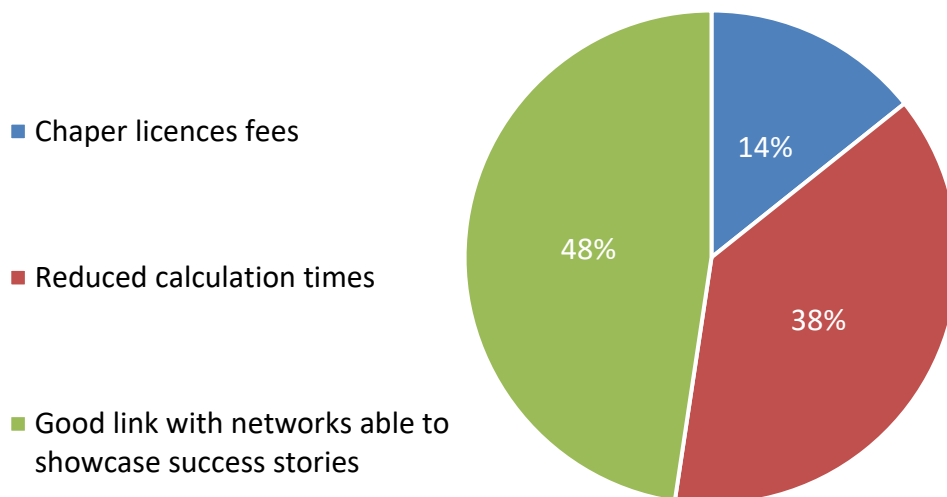


Figure 9 - Resources needed to boost modelling use

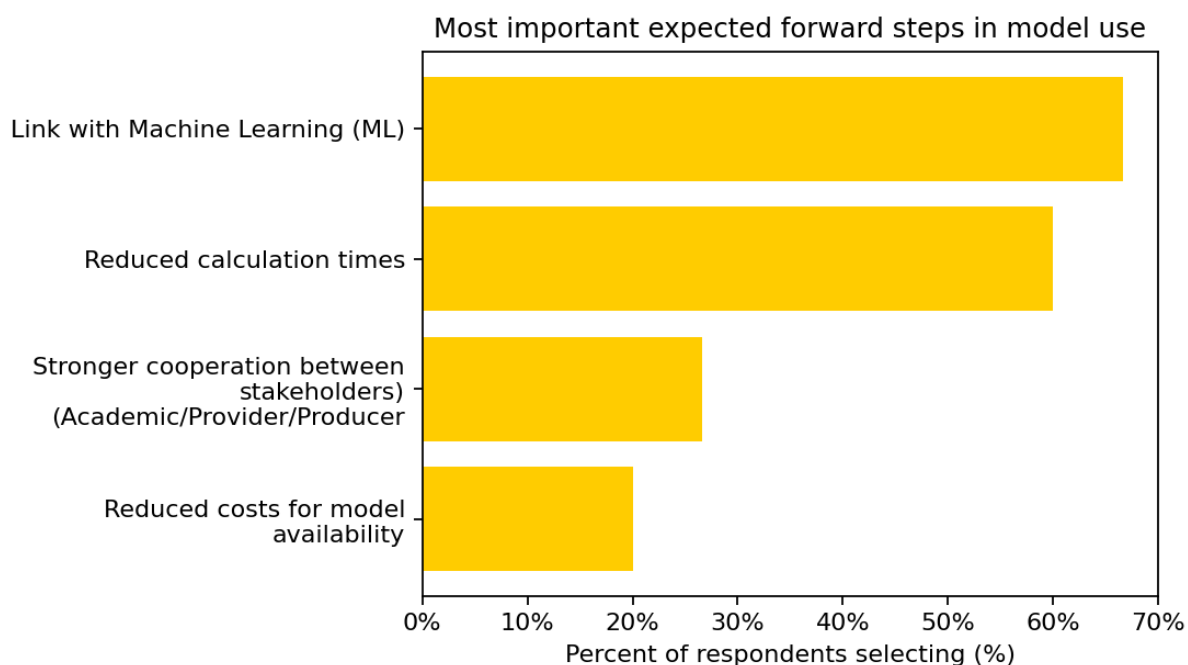


Figure 10 – Expected forward steps forward in model use (% of respondents)

Overall, the feedback gained from the modelling users is that modelling is increasingly recognised as a valuable component of CC process support, yet its practical integration remains uneven across organisations. Users show strong interest and generally positive sentiment, but report substantial variability in familiarity, expertise and frequency of use. The modelling activity is perceived as most effective when delivering fast, operationally relevant guidance.

Key adoption barriers relate to validation, usability, and the time required to obtain results. Users consistently request clearer evidence of benefits, well-structured success stories, and streamlined workflows. Moreover, expectations for the near future emphasise hybrid/ML enhanced tools and reduced computational times.

3. CONCLUSIONS

The relevant feedback from the model users is that reducing license costs, improving computational efficiency, and strengthening networks for sharing success stories are identified as essential resources to boost model use, at least from a merely technical point of view.

Future steps to modelling use boosting, based on the aspects emerged as outcome of METACAST, can be summarized as follows:

- strengthening validation frameworks and demonstrators to increase confidence,
- developing concise impact evidence to support user decision making,
- improving modelling workflows and computation speed,
- supporting harmonised methodologies across industrial and research partners,
- preparing the ground for hybrid physics ML models and efficient ROM approaches,

These actions will help consolidate modelling as a trusted operational tool, expand its industrial relevance, and foster broader adoption across the CC community.

Issues concerning training, management sentiment and current/expected strategies on modeling use, and future trends are shown in separate documents (D4.3, D5.3 and D6.3) leaning on the overarching questionnaire form launched close to the project end and reported in Appendix.



4. APPENDIX – OVERALL QUESTIONNAIRE FORM



1. What is your current professional role? *

☐ Researcher

☐ Student

☐ Manager

☐ Academic/Professor

☐ Legal

☐ Marketing

☐ HR

☐ Engineering

☐ Altro

2. How familiar are you with modeling and simulation tools applied to continuous casting? *

- ☐ Not familiar
- ☐ Slightly familiar
- ☐ Moderately familiar
- ☐ Very familiar (Regular user)
- ☐ Expert (Developer/Instructor)

Feedback from Model Users

This section is dedicated to those who work directly with modeling tools. It aims to identify the specific technical objectives, current skill levels, and perceived obstacles from a practitioner's perspective.

3. What is the role of model users within your organization?

- ☐ Internal R&D researchers
- ☐ R&D committed to supporting industrial companies
- ☐ Technology providers supporting producers
- ☐ Academics supporting producers
- ☐ Altro

4. What is your primary technical objective when using models?

- ☐ Problem-solving
- ☐ Knowledge acquisition/Fundamental understanding
- ☐ Academic research/Training
- ☐ Altro

5. On a scale of 1 to 5, how would you rate your modeling expertise? (1 = Interpreting results only; 5 = Full model development capability)

☆☆☆☆☆

6. What do you recommend to improve and foster the use of modeling within this context?

- ☐ Better information and success stories from networks
- ☐ Clearer evidence of expected industrial benefits
- ☐ Increased resources (personnel/funding) and tool access
- ☐ Reduced response times for problem-solving
- ☐ Altro

7. What is your general 'sentiment' regarding modeling in continuous casting?

- ☐ Positive
- ☐ Generally positive
- ☐ Somewhat positive, with application/validation drawbacks
- ☐ Useful for understanding, but limited for problem-solving
- ☐ Not successful

Training Programme

This section targets the strategic view of modeling. It evaluates how management perceives the value of these tools and identifies the structure (or absence) of professional development programs.

8. Does your company have a modeling training program?

- ☐ Yes, Internally
- ☐ Yes, Externally
- ☐ No

9. What is the primary reason for the absence of a training program?

- ☐ Not necessary for company objectives
- ☐ Prohibitively expensive
- ☐ Lack of available experts
- ☐ Altro

10. What is the target audience for these training programs?

- ☐ R&D researchers
- ☐ Researchers acting as interfaces for external consultants
- ☐ Technology providers supporting producers

11. What is the baseline skill level required for those entering model use?

- ☐ Academic background
- ☐ Technical basics with on-the-job training
- ☐ Interpretation support only (work performed by externals)

12. What are the main barriers/obstacles hindering a full and fruitful model training?

- ☐ Model availability
- ☐ Models knowledge
- ☐ Time to deal with modelling
- ☐ Awareness of model importance
- ☐ Match with the industrial issues
- ☐ Altro

13. What do you recommend to improve and foster training on modeling use?

- ☐ Showcasing success stories and networks
- ☐ Evidence of industrial benefits
- ☐ Increased resources and tool availability
- ☐ Faster response times for reliable results

Stakeholders' management

This section explores the strategic view of modeling. We seek to understand if management perceives these tools as high-value investments or merely operational costs

14. How does management generally perceive the value of modeling tools?

- ☐ Essential for process control and plant solutions
- ☐ Useful for insights, but secondary to other methods
- ☐ A luxury or non-essential expense
- ☐ Altro

15. What feedback does management typically provide regarding modeling results?

- ☐ Positive: They value and act on the results
- ☐ Mixed: Results are useful but take too long to produce
- ☐ Negative: Results are rarely applicable to real-world issues

16. What are the main strategic barriers preventing management from investing more in modeling?

- ☐ High cost of resources (people and licenses)
- ☐ Urgency of industrial issues (models take too long)
- ☐ Lack of clear evidence regarding ROI/Benefits
- ☐ Altro

17. Do the management currently arrange training plans for modelling use?

- ☐ Yes, cared by internals/already skilled resources
- ☐ Yes, cared by model developers/code vendors
- ☐ Yes, cared by academics
- ☐ Not at all
- ☐ Yes
- ☐ Altro

18. What do you need or should recommend to improve and foster the modelling use?

- ☐ More information and showcasing success stories from networks (projects, academics,...)
- ☐ More evidence of the industrial benefits expected
- ☐ More availability of resources (people/money), easier availability of the model
- ☐ Reducing response times to have reliable results functional to problem solving
- ☐ Altro

19. What are the main barriers/obstacles hindering a modelling formation strategy?

- ☐ Resources (people, money for licences)
- ☐ Time to deal with modelling (need of quick answers to problem solving)
- ☐ Awareness of model importance
- ☐ Match with the industrial issues
- ☐ Altro

Optimal Use of Modeling in the Steel Industry

This final section focuses on the future outlook and the most significant steps required to bridge the gap between theoretical modeling and industrial reality

20. What is currently the most successfully achieved goal of casting modeling?

- ☐ Problem-solving
- ☐ Knowledge building
- ☐ Academic/Training
- ☐ Altro

21. Which aspect of casting modeling requires the most improvement?

- ☐ Fundamentals
- ☐ Validation
- ☐ Practical Application
- ☐ Training
- ☐ Integration with ML/AI and process control
- ☐ Altro

22. What is the most important forward step expected in model use trends?

- ☐ Link with Machine Learning (ML)
- ☐ Reduced calculation times
- ☐ Reduced costs for model availability
- ☐ Stronger cooperation between stakeholders) (Academic/Provider/Producer
- ☐ Altro

23. What is required from the following perspectives to boost modeling adoption?

- ☐ Workers' Skills: (e.g., Internal education vs. external experts)
- ☐ Resources: (e.g., Lower costs, less time-consuming results)
- ☐ Academic/R&D Engagement: (e.g., Disseminating results, dedicated seminars)
- ☐ Stakeholders: (e.g., Confidence based on success stories, investing in AI skills)
- ☐ Altro

24. What is needed for the point of view of the resources for boosting the modeling adoption?

- ☐ Lower modelling costs
- ☐ Less time consuming model results
- ☐ A fruitful link with networks able to showcase modelling fruitful use and success stories
- ☐ Altro

25. What is needed for the point of view of the academic/RTO engagement for boosting the modeling adoption?

- ☐ More commitment in disseminating results also from Institutional projects (EU; National, regional)
- ☐ More commitment in foster awareness with dedicated actions/seminars
- ☐ More commitment in dedicated educational plans together with stakeholders
- ☐ Altro

26. What is needed for the point of view of the stakeholders (producers, technology providers) for boosting the modeling adoption?

- ☐ Being more confident to modelling use based on success stories
- ☐ Invest ton people skill in this field as ML is becoming more and more relevant
- ☐ Favoring the setup of working group on dedicated topics
- ☐ Altro

zione 6

Greetings

27. Thanks for answering. If you would like to contribute further to the survey, please leave your email and we will contact you.

Inserisci la risposta