Translator guiding industry in decisions

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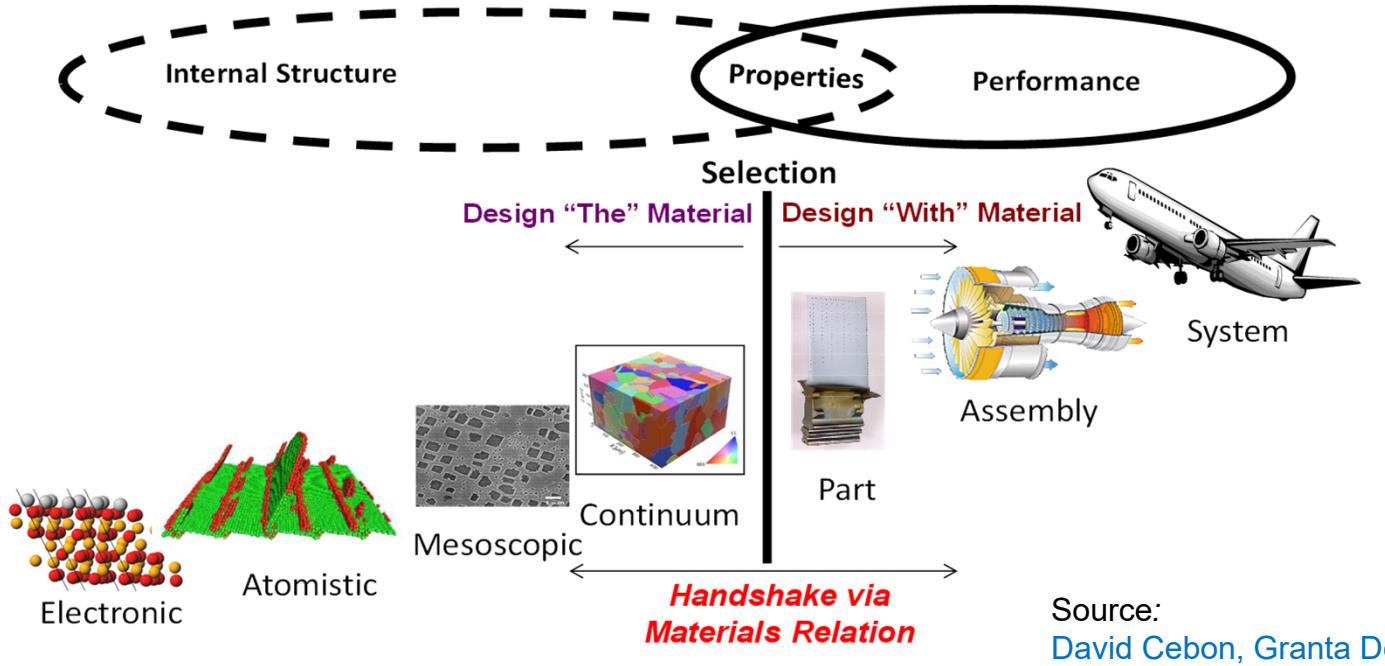
Industrial Potential of Materials Modelling



Source:
David Cebon, Granta Design, Presentation at EMMC International Workshop2017, Vienna, 5-7 April 2017

Materials Modelling Community -> to capture the present and future materials knowledge in a digitised format for the effective and efficient use across various industry sectors and application areas

EMMC Working Groups

Modelling and Validation
Aims to identify model gaps and establish roadmaps for model development

Interoperability and Integration
Develops, supports and coordinate the use of a common terminology and European Materials & Modelling Ontology (EMMO).

Translation and Training for Companies
Develop the role of translators as the bridge between manufacturers and materials modelling experts.

Repositories and Marketplace
Marketplaces provide manufacturers a one-stop shop, a single access point to materials modelling resources and data repositories in Europe

Professional Software Deployment
Stimulates and supports the industrial exploitation of materials modelling software and innovations in Europe.

Industrial Integration and Economic Impact
Bring materials modelling closer to manufacturers and measures its economic impact on industry.

The Working Groups are open to all stakeholders.

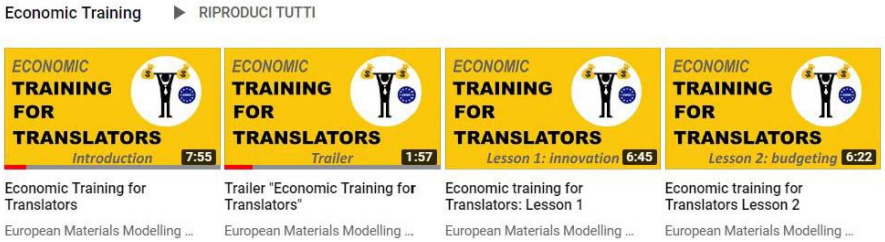
https://emmc.info/main/working-groups/

Translation activities within EMMC-CSA

- EMMC-CSA workshop in Vienna, April 2017, February 2019
- EMMC-CSA Expert meeting on Translation, June 2017, Eindhoven
- Translator Case and Industrial User Case Surveys, April-August 2017
- EC Translation workshop, September 2017
- Translation sessions with Training elements within E-MRS Meeting in Warsaw (2017) and ECCOMAS in Glasgow (2018)
- EMMC Workshop on Industrial view and needs for Translation, Eindhoven, 2018
- EMMC-CSA Expert meeting on Training Requirements for Translators, March 2019, Hamburg
- Translation presentations at several industrial and scientific conferences/events
- Economic Training for Translators

<u>Translation documents</u>

- Translators Charter
- Translators Guide
- Methodologies for translators
- Translation cases
- EMMC Road Map



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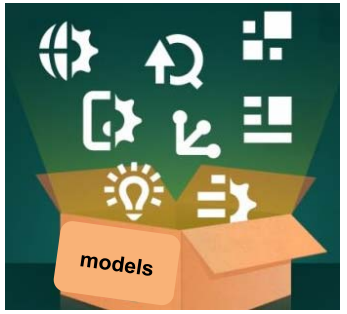
EMMC YouTube channel

Translation = bridging the gap between modellers and industry

Industrial world:

- Often not aware of the full potential of modelling or/and
- Often needs guidelines in selecting the suitable modelling workflow(s) for solving their problem(s)



Academic modelling world:

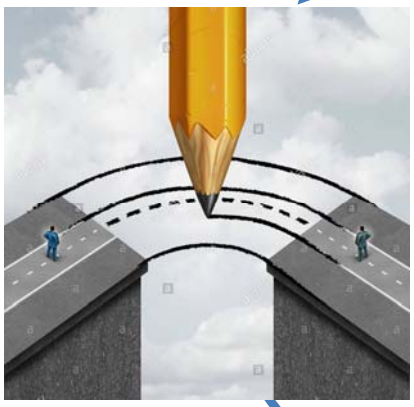
- Often not fully aware of the nature of industrial problems

Translators: multi-professional specialists or team of professionals. Translators fulfil a **role**

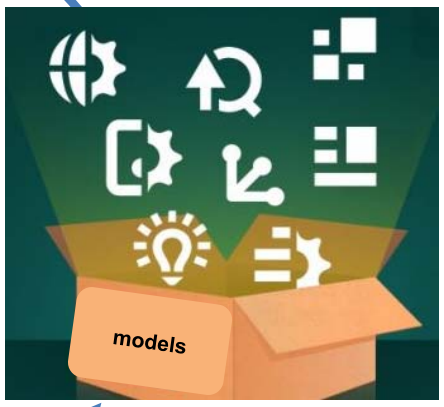
- ✓ Understand both worlds and speak both languages!

Translation process

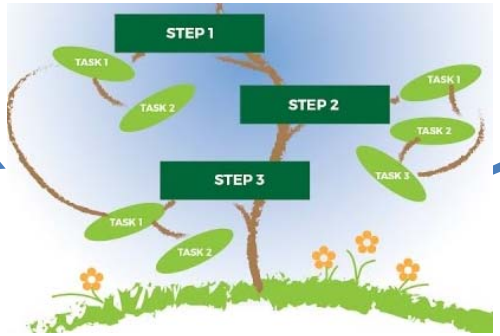
Analysis of the industrial problem



Translation process:
usually **iterative**



Translation into parts that can be simulated



Interpretation of modelling outcome

Building modelling workflows

Tasks of the Translator

Understands the business case

Understands the industrial case

Analyse the experimental (and modelling) data available within the client

Translate to (preferably more than one) modelling workflows

Propose to the client modelling executor(s) and strategy for model validation

Translate the modelling results to information that is understandable, reliable and usable by the client

Source:
Translators Guide
https://emmc.info/translation-and-training-for-companies-resources

The Translation process

Good understanding of the business case:

- *Impact (e.g. profit, jobs, …)*
- *Risks*
- *Timeline of the client*
- *Expected by the client outcomes (soft and hard)*

Good understanding of the industrial case:

- *Where and what exactly is the problem: material or processing related or other*
- *Factors that have an effect e.g. technical specifications.*

Analysis of the experimental data available within the client:

- *This data is needed for model input and validation.*
- *The quality and accuracy/uncertainty of this data must be well understood.*
- *If needed, the Translator can propose "dedicated experiments"*

The Translation process

Translation to (preferably more than one) modelling workflows, considering:

- *The specifications of different potentially useful models/software tools:*
  - *Availability*
  - *Suitability,*
  - *Efficiency,*
  - *Level of maturity (user friendliness, especially for SMEs),*
  - *Accuracy*
- *Client's experience and preferences*
- *Costs: investments in person months and hardware, simulation time*
- *Return of investment / benefit*
- *Validation of the model: available experimental data and generation of new data*
- *Give good/objective argumentation for the proposed modelling workflows*

The Translation process

Proposition to the client with the most suitable modelling executor(s) and strategy for model validation

- *Give good/objective argumentation for the proposed executors*
- *Based on executor's expertise, experience, availability and client's preference (if any)*
- *Follow the project execution and represents the client interests*

Translation of the modelling results to information that is understandable, reliable and usable by the client

- *A follow-up, evaluation of the process, interpretation and recommendations are desirable but not always required*

Skills of the Translators

- Industrial background
- Deep and broad knowledge of modelling
- Broad understanding of different experimental techniques and data analysis
- Softs and analytical skills
- Knowledge of economic impact
- Communication skills and project management
- Being neutral
- Expected to show a proven “track record” of expertise on translation
- Managing data confidentiality

*The Translator is often not an individual person but a role which is usually best fulfilled by a **team of people** with the required skills!*

Translation for companies: Internal and External Translators

Internal and external translation

- Internal translation: translation performed by employees of industrial end user for their own company (or/and for company's clients)

- External translation: translation performed by external (independent on the client) translator

"Universal" translation process: **independent** on the size of the industrial client but allowing for flexibility

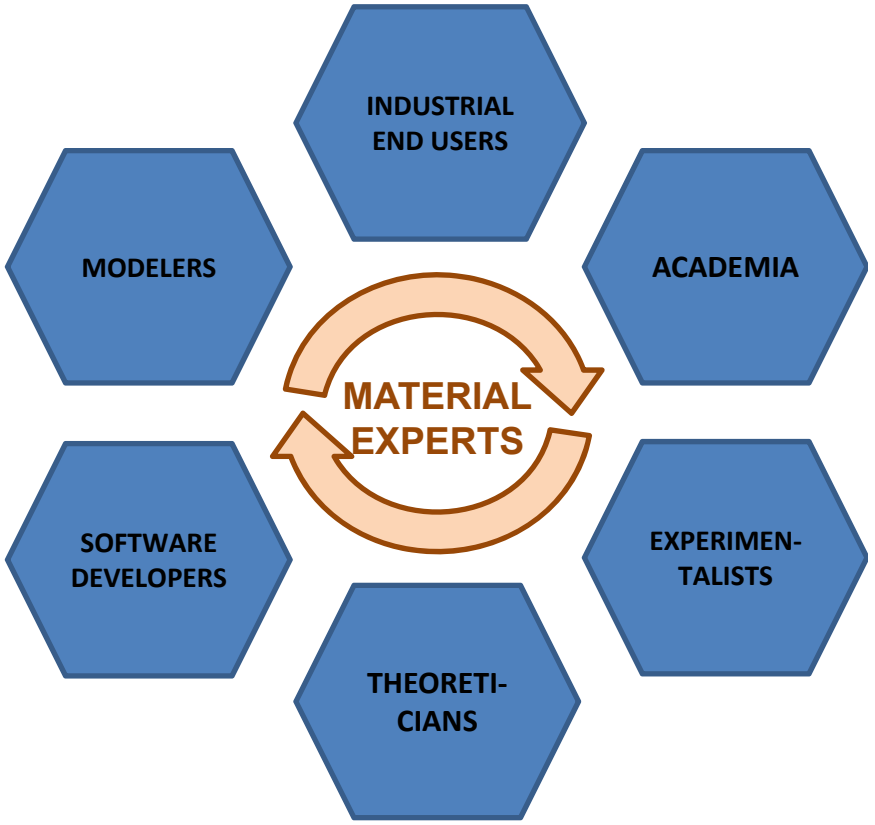
Terminology

Modelling of industrial problems is **MULTI-SCALE MODELLING** which requires **MULTIDISCIPLINARY** and **INTERACTIONS** between different models and materials data

EACH COMMUNITY
HAS ITS OWN TERMINOLOGY !!!

Translator needs to talk and understand the language of each community

Use the **TERMINOLOGY** in materials modelling which can simplify the modelling description and provide more **efficient communication**



The CEN Workshop Agreement
CWA 17284 "Materials modelling – terminology, classification and metadata"

https://www.cen.eu/news/workshops/Pages/WS-2017-012.aspx

EMMC Translation Template

Documentation of Translation praxis for

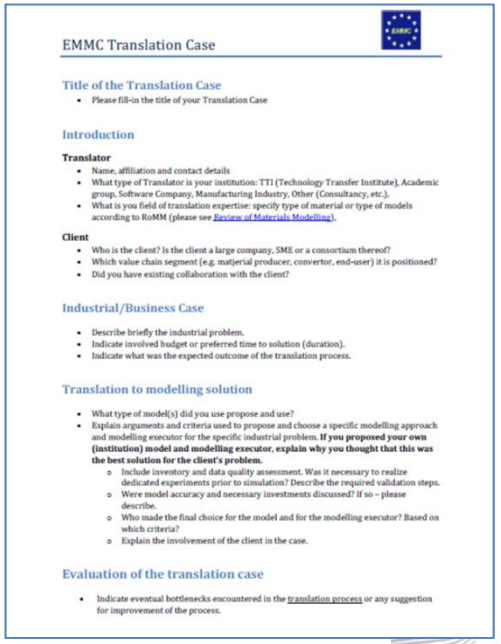
- **successful business development** and
- contribution for **Modelling Innovation Hubs**

Translation Case

https://emmc.info/emmc-translation-case-template/

- To use it as a reference for your expertise and experience as translator
- To share it with other translators
- To document (keep a track on)
  your own activity and external relations

Open Translation Case examples from/for SMEs



EMMC Translation Case

Title of the Translation Case
- Please fill-in the title of your Translation Case

Introduction

Translator
- Name, affiliation and contact details
- What type of Translator is your institution: TTI (Technology Transfer Institute), Academic group, Software Company, Manufacturing Industry, Other (Consultancy, etc.).
- What is you field of translation expertise: specify type of material or type of models according to RoMM (please see Review of Materials Modelling).

Client
- Who is the client? Is the client a large company, SME or a consortium thereof?
- Which value chain segment (e.g. matjerial producer, convertor, end-user) it is positioned?
- Did you have existing collaboration with the client?

Industrial/Business Case
- Describe briefly the industrial problem.
- Indicate involved budget or preferred time to solution (duration).
- Indicate what was the expected outcome of the translation process.

Translation to modelling solution
- What type of model(s) did you use propose and use?
- Explain arguments and criteria used to propose and choose a specific modelling approach and modelling executor for the specific industrial problem. **If you proposed your own (institution) model and modelling executor, explain why you thought that this was the best solution for the client's problem.**
  - Include inventory and data quality assessment. Was it necessary to realize dedicated experiments prior to simulation? Describe the required validation steps.
  - Were model accuracy and necessary investments discussed? If so – please describe.
  - Who made the final choice for the model and for the modelling executor? Based on which criteria?
  - Explain the involvement of the client in the case.

Evaluation of the translation case
- Indicate eventual bottlenecks encountered in the translation process or any suggestion for improvement of the process.

Source:
https://emmc.info/translation-and-training-for-companies-resources

Tasks of the translator and Translation Case template

Tasks of the translator

1) Understands the business case

2) Understands the industrial case

3) Analyse the data (experimental and modelling) available within the client

4) Translate to (preferably more than one) modelling workflows

5) Propose to the client modelling executor(s) and strategy for model validation

6) Translate the modelling results to information that is understandable, reliable and usable by the client

Content of the Translation Case template

Industrial/Business case
- technical problem definition
- budget
- time
- expected outcome of the translation

Translation to modelling solution
- **Data** assessment (existing data, quality, additional data → investment)
- Proposed **models** (types and criteria, model accuracy, additional R&D → investment)
- Choice of model (criteria, who makes the choice) and of **executor**

Evaluation of the translation and client's **benefits** of the modelling (qualitative and quantitative)

Source: *EMMC Workshop on Training Requirements for Translators, Hamburg, 2019*
https://emmc.info/events/emmc-expert-meeting-on-training-requirements-for-translators/

Training for Translators

TRANSLATION, TRAINING & TEACHING-> T^3

Multi-focused and multi-disciplinary education

Basic economical training:
Business case understanding
Industrial content –> practice
Project management,
Communication skills,
Psychological approaches,
Leadership coaching

Domain specific technical training:
Modelling approaches,
Materials databases / Translation database,
Software tools,
Licensing scheme,
Intellectual Property,
Time to solution features,
Experimental approaches/ techniques

Training for **Translation case evaluation:**
Estimation of modelling projects benefits,
“Translate back”– techniques,
Translation documentation database,
ROI calculation, total-cost-of-ownership,
Qualitative and quantitative benefits
KPI

Develop the Taxonomy/Ontology for modelling Translation

Upcoming 2019 / Outlook

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- EMMC report on translation methodologies
- EMMC report on Training requirements for Translators
- Publication of the Translation documentation in a scientific journal

EMMC Workshop
July 08-10, 2019
Turin/ Italy

https://emmc.info/events/emmc-torino2019/

Session 1: Materials modelling techniques
Session 2: Scientific software development
Session 3: Economic impact of materials modelling
Session 4: **Translation & Training for companies**
Session 5: Interoperability and integration
Session 6: Artificial intelligence & Industry 4.0

The modelling **Translation Ontology** - **STRATEGIC IMPORTANCE** for the modelling and manufacturing community

Conclusion

- Translators **guiding industry** **through** **decision making**
- Translators are **multi-professional specialists** or team of professionals
- Translators promote modelling executing in industry and support development of **innovations** as well as **new industrial topics** or **strategic changes**
- Translators may document best practice using the **EMMC Translation Case** template and publish the materials on the emmc.info
- A focused **Open Platform** for **Translation** needs to be created to contribute to the development of translation service in Europe. The platform shall include and support

  Translation database

  Translation documentation

  Training for translators

and could be used for the coordination of the translation activity in Europe to stimulate development of novel materials and products

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