

# Translators and enterprises cooperating in the solution of innovation challenges: the OntoTrans approach

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# Agenda

## **Translators cooperating with industry enterprises**

- Textual information
- Translation
- Innovation and Industry 5.0
- Interactions between organisations
- Translation in materials innovation
- The OntoTrans Approach

# Translation in history

## Gathering textual facts on organised cities and product flows - Meroë

- Fact #1 from Herodotus, 5<sup>th</sup> century BC – a European perspective:
    - „South of Elephantine ... after 40 days' journey on land one takes another boat and in twelve days reaches a big city named Meroë ... There is an oracle of Zeus there ...“<sup>1</sup>
  - Fact #2 from R. Morkot, 21<sup>st</sup> century AD – a European perspective:
    - The royal city Meroë supplied Egypt and the Roman Empire with ivory, ebony, incense ...<sup>1</sup>
- ⇒ Who/What does help to understand situation, activities, decisions?
- Being in the audience, do you feel
    - happy that Herodotus' text is shown after translation from Greek to English?
    - lost because two sets of information are given and the context is not clear?
    - that your expectations were exceeded?

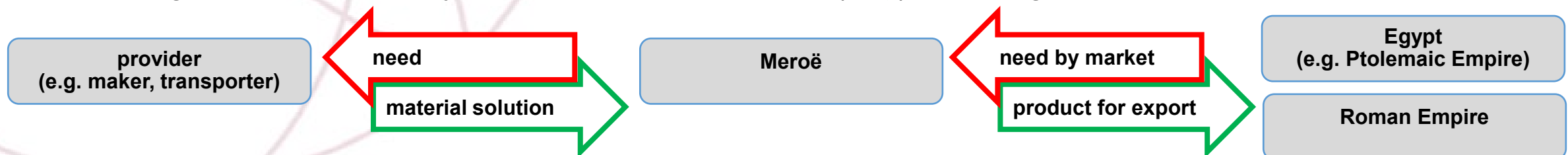
<sup>1</sup> J.J. Norwich, The Great Cities in History, 2016, Thames & Hudson, London, UK, ISBN: 9780500292518



# Translation in historical business

## Make information a white box and FAIR – for us

- Herodotus, 5<sup>th</sup> century BC – a European perspective:
    - „South of Elephantine ... after 40 days' journey on land one takes another boat and in twelve days reaches a big city named Meroë ... There is an oracle of Zeus there ...“<sup>1</sup>
  - R. Morkot, 21<sup>st</sup> century AD – a European perspective:
    - The royal city Meroë supplied Egypt and the Roman Empire with ivory, ebony, incense ...<sup>1</sup>
- ⇒ Who/What does help to understand situation, activities, decisions?
- E.g., a sketch, an encyclopedia, some translation (↔) revealing a business purpose?



<sup>1</sup> J.J. Norwich, The Great Cities in History, 2016, Thames & Hudson, London, UK, ISBN: 9780500292518

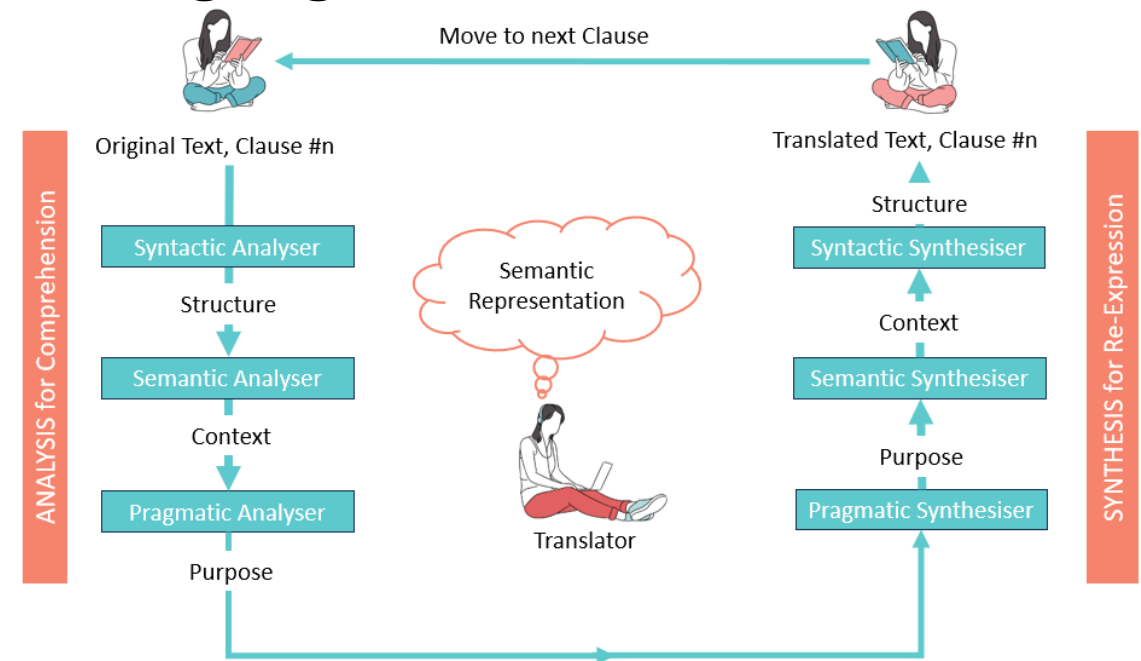
<sup>2</sup> [https://upload.wikimedia.org/wikipedia/commons/thumb/1/1f/NE\\_200bc.jpg/420px-NE\\_200bc.jpg](https://upload.wikimedia.org/wikipedia/commons/thumb/1/1f/NE_200bc.jpg/420px-NE_200bc.jpg)

# Translation of textual messages

## Translators translating natural source language text – for us

- Bell's model of translation

<sup>1</sup> adapted following: R.T. Bell, Translation and Translating,  
<https://doi.org/10.4324/9781315846705>



[1]

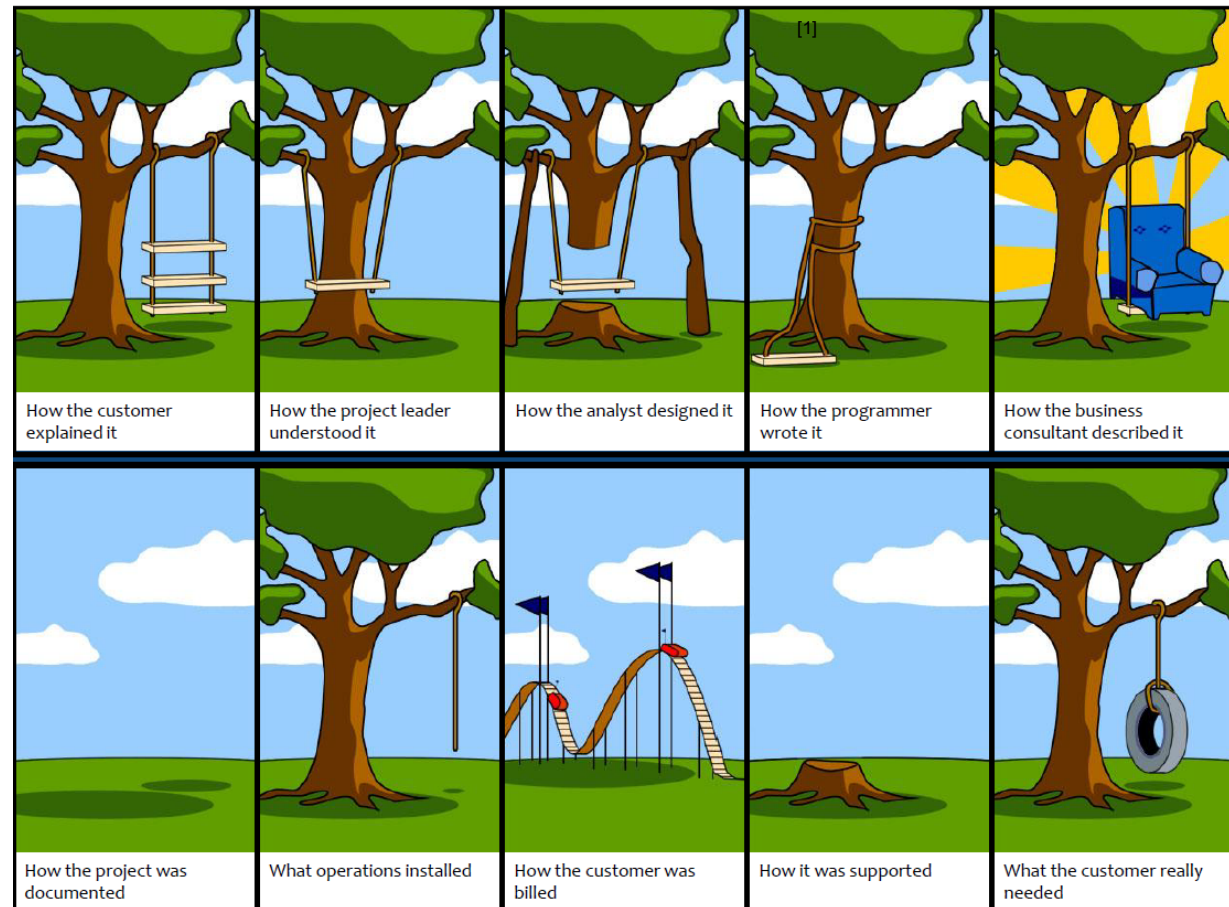
- ⇒ Let's bring translation into the context of an organisation (in manufacturing)!
- ⇒ Let's make semantic representation FAIR (findable, accessible, **interoperable**, reusable)!
- ⇒ Let's express the meaning of concepts in a persistent form!

# Translation – human actors in projects

## Make innovation in manufacturing a white box – for any role involved

- the customer (talking about needs)
  - and
  - the project leader
  - the analyst
  - the programmer
  - the business consultant
- doing their best for
- documenting the (step-wise) project
  - getting installed the final solution
  - supporting their customer

<sup>1</sup> from: P. Ladegaard et al.,  
 “Measuring Regulatory Performance Experiences from the World Bank Group”,  
[https://www.oecd.org/gov/regulatory-policy/1\\_coglianese\\_web.pdf](https://www.oecd.org/gov/regulatory-policy/1_coglianese_web.pdf)

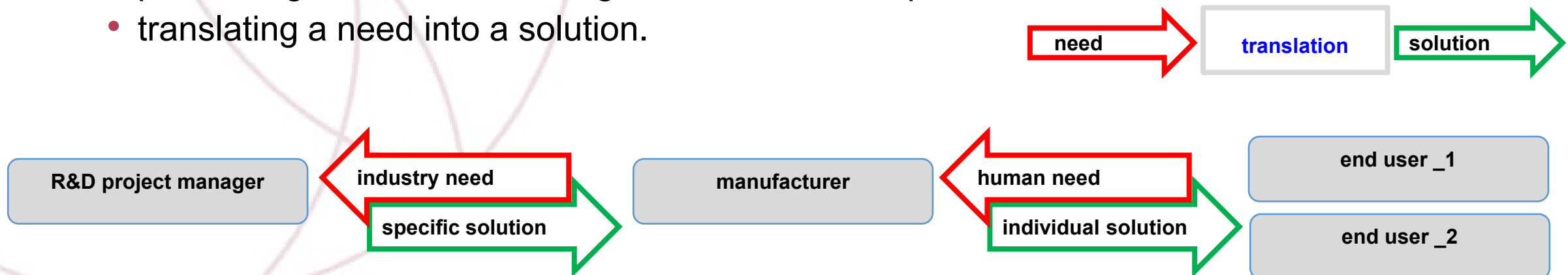


[1]

# Translation in manufacturing

## Make innovation a white box and FAIR – for any interested party

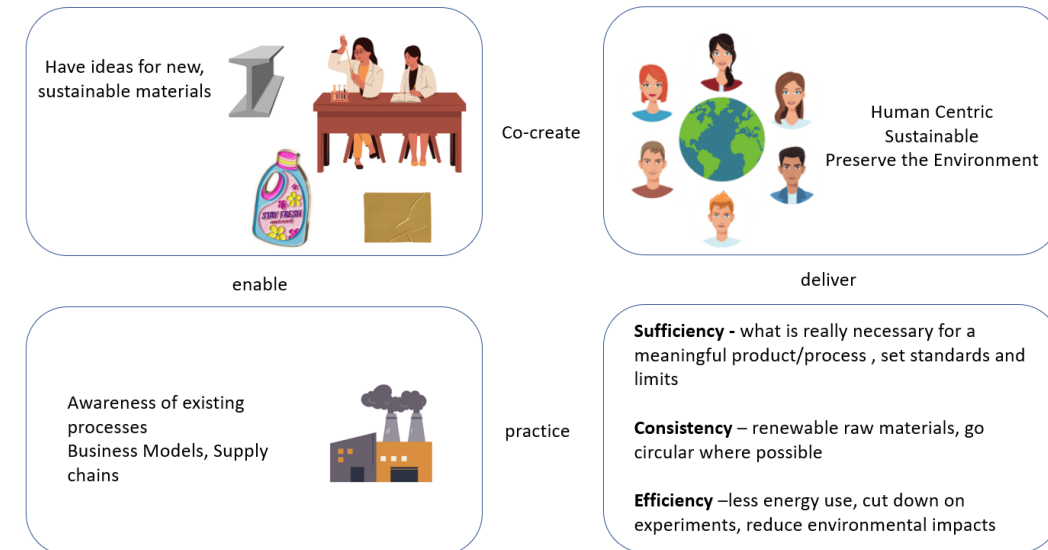
- In manufacturing, following DIN EN ISO 9000:2015-11
  - **innovation** relates to a new or changed object realizing or redistributing **value**
  - activities resulting in innovation are generally managed.
- Translators support innovation managers by
  - performing **translation**, a dialogue-based semiotic process
  - translating a need into a solution.



# Innovation challenges

## Embrace translation in a holistic way<sup>1</sup> – for us

- The **high-level innovation challenge** is global, and so is the **high-level** value to be realized.
- ⇒ In the manufacture of products, from a European **industry** perspective,
  - the historical four industrial revolutions (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and 4.0) in 2021 were complemented by **Industry 5.0**
    - towards an industry that is more
      - **sustainable,**
      - **resilient,**
      - **human-centric**
    - and the focus is on:
      - **stakeholder value**
      - rendering **value chains** more robust



<sup>1</sup> P. Klein et al., Translation in Materials Modelling – Process and Progress, DOI: 10.5281/zenodo.4729918

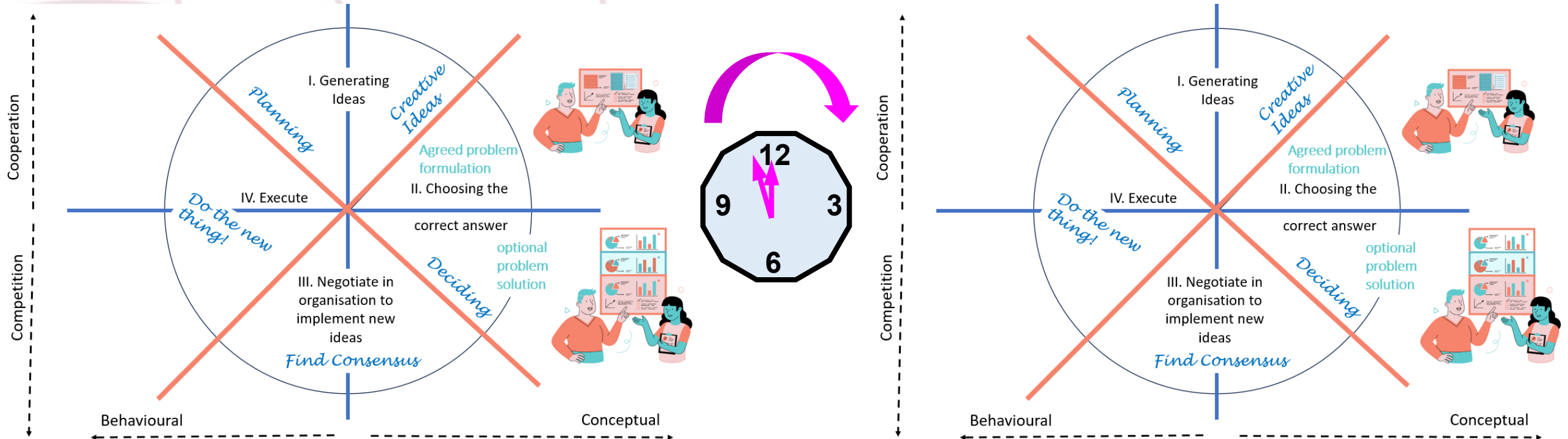


# Innovation – continual improvement

## Organisations embrace interested parties in innovation

- Organisation 1 *talk, talk and talk*, also with Organisation 2

[1]

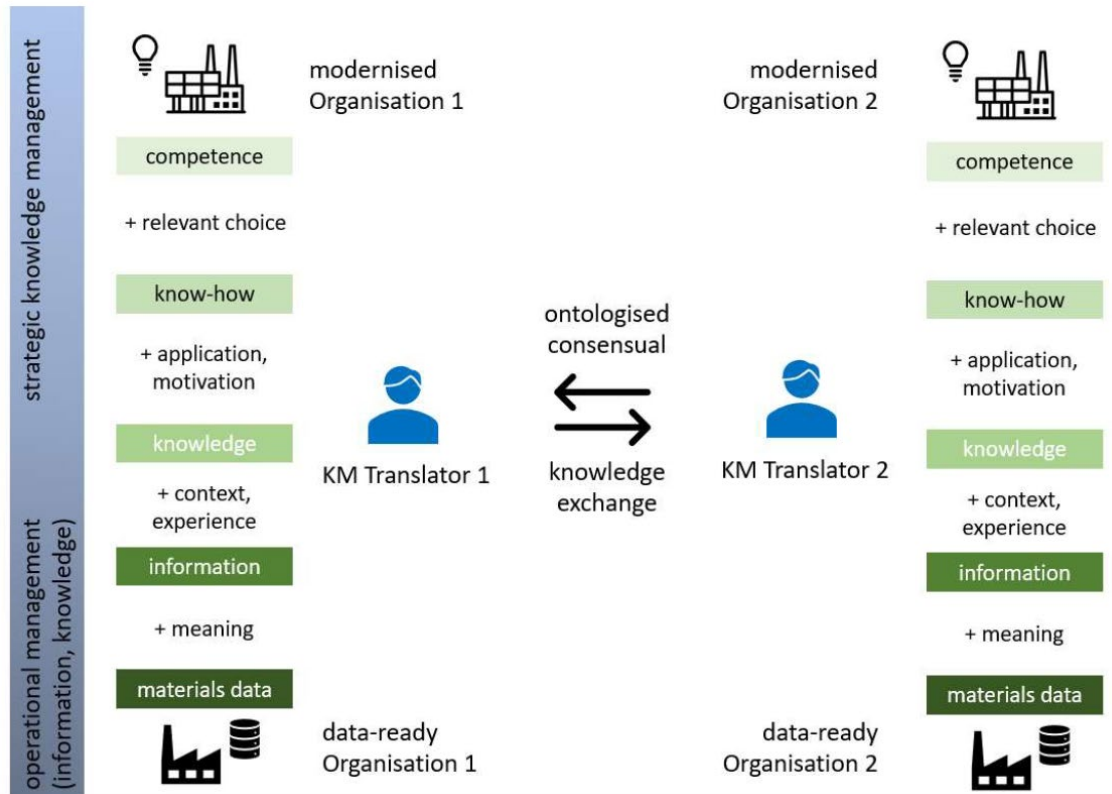
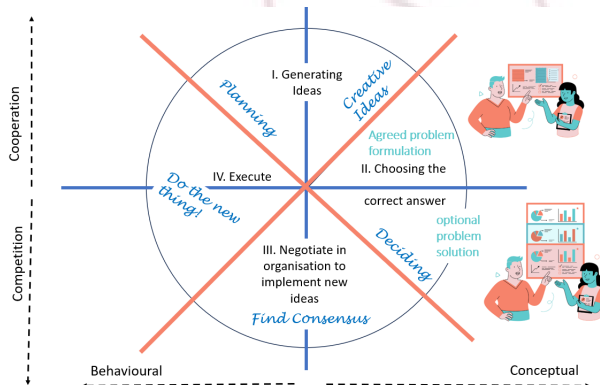


<sup>1</sup> adapted from the Group Task Circumplex as presented in: J.E. McGrath, Groups: Interaction and Performance, 1984, Prentice Hall, New Jersey, US

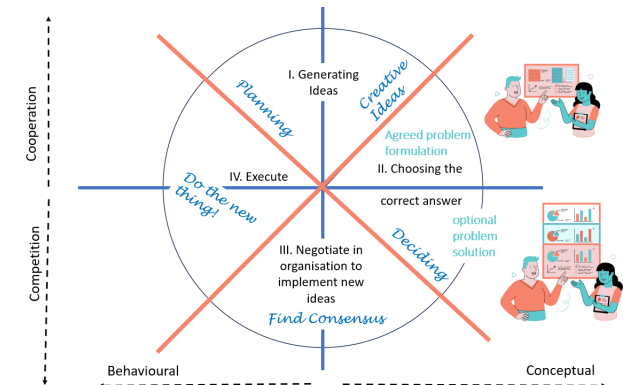
# Innovation – cooperative improvement

Organisations embrace interested parties in innovation – with translators

## • Organisation 1



## Organisation 2



<sup>1</sup> G. Goldbeck et al., The Translator in Knowledge Management for Innovation – towards Industry Commons, DOI: 10.5281/zenodo.7041696

# Innovation challenges

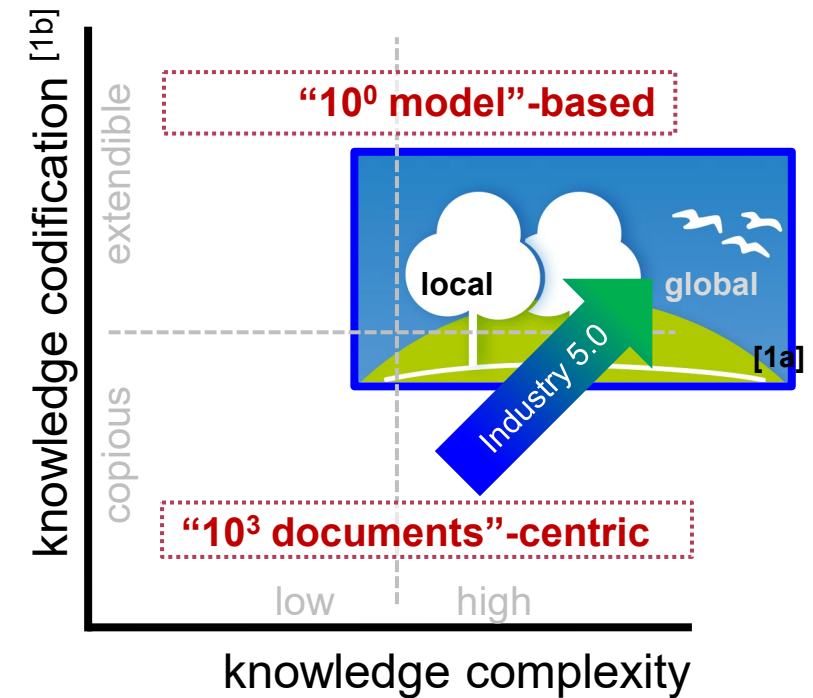
## Embrace translation in a holistic and **managed** way – for us

- Industry organisations face **innovation challenges**
  - and mostly use DIN EN ISO 9000 for quality management.
- DIN EN ISO 9000:2015-11 uses a process approach for **managing activities**,
  - each organization's processes may operate as a complete integrated **system**.
- ⇒ „Consistent and **predictable results** are achieved more effectively and efficiently when **activities** are **understood** and **managed** as **interrelated processes** that function as a **coherent system**.“ .
- ⇒ „The **performance of the organization** is dependent upon how **people** behave **within the system** in which they work.“
- ⇒ An individual (**managed**) innovation case and new product is part of a global scenario.
- ⇒ In view of global challenges, managed **ecosystems** are being formed to
  - gain speed
  - join **efforts**
  - comprise **further generations**.

# Innovation complexity

## Embrace individual documentation and communication

- Each innovation case **input** is complex.
- Impact of **innovation outcome** is global.
- ⇒ Increased customer **value** is aspired,
  - e.g. by co-innovation with (**human**) users.
- ⇒ Relevant information is required,
  - i.e. relevant {data + meaning}.
- ⇒ Missing knowledge and data is to be generated,
  - rooted in documented concepts;
  - for achieving end-**to-end** solutions.



... from manufacturer's perspective

<sup>1a</sup> B. Mayer et al., Circular Economy and Adhesive Bonding Technology, DOI: 10.24406/iml-n-603186, <sup>1b</sup> plot adopted based on Xie et al., DOI: 10.1016/j.technovation.2015.12.002



# Information challenges

## Embrace translation in a holistic way

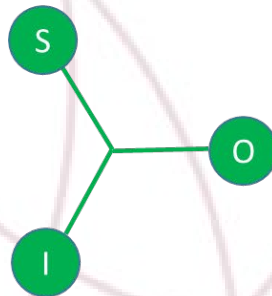
- The quality of products (materials, services) is governed by the quality of information exchange.
  - The communicative key expertise “**translation**” facilitates mutual [understanding](#).
  - Holistic dialogues are meant to comprise more than two stakeholders.
- Ontologies are fundamental for [level-comprehensive](#), holistic and cooperative **translation** in complex systems.
  - In H2020 OntoTrans, ontologizing (based on EMMO) is pathbreaking for boosting
    - translation
    - innovation
    - e.g. relating an organisations’s resources (e.g., materials, processes, people) with the data used to describe them.

# Translation as a process

... starting from input perceived and interpreted from distinct perspectives

⇒ A dialogue partner may not immediately “understand” surprising input

S ... sign  
I ... interpretant  
O ... object



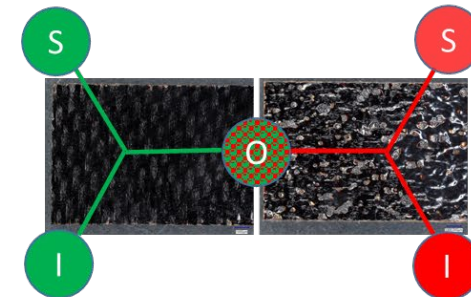
O ... a photograph of real-world objects



Observer 1



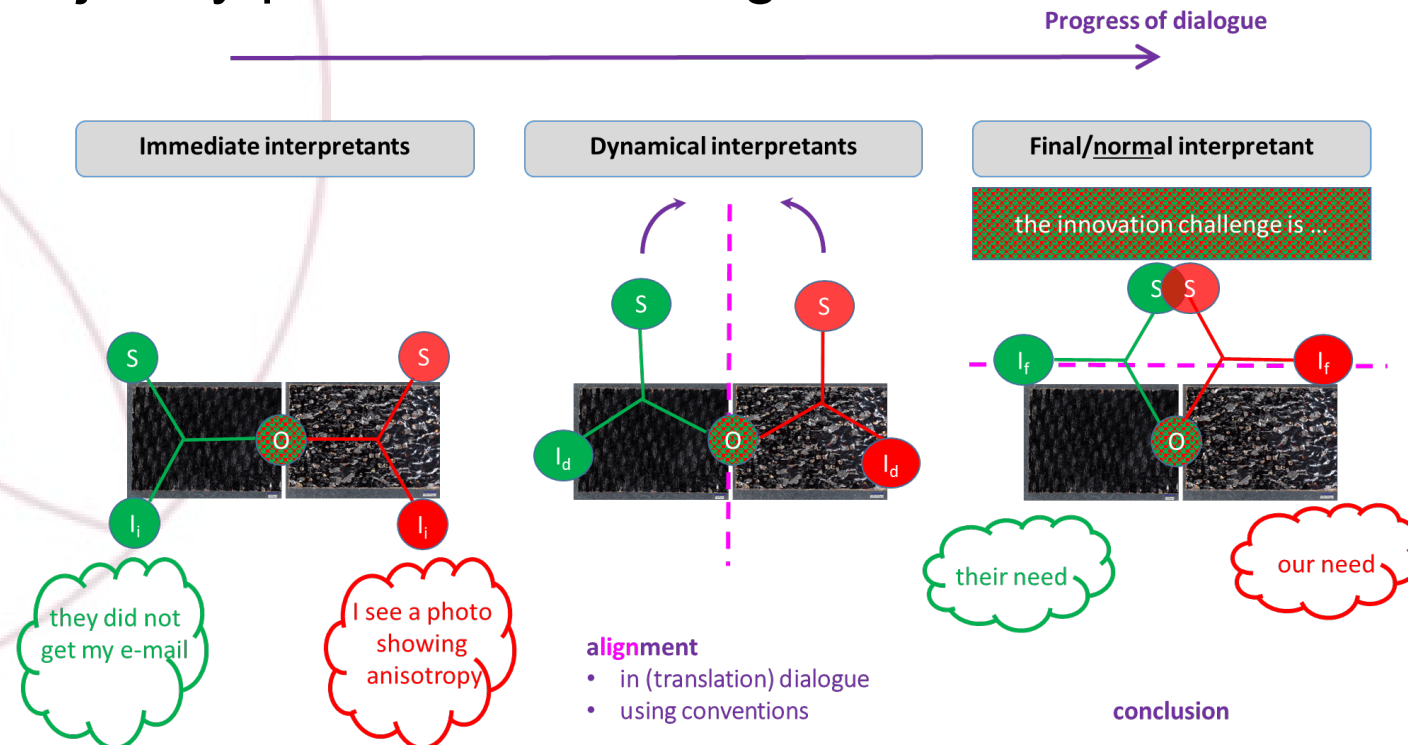
Observer 2



# Translation as a dialogue

## Cooperation to understand the innovation challenge

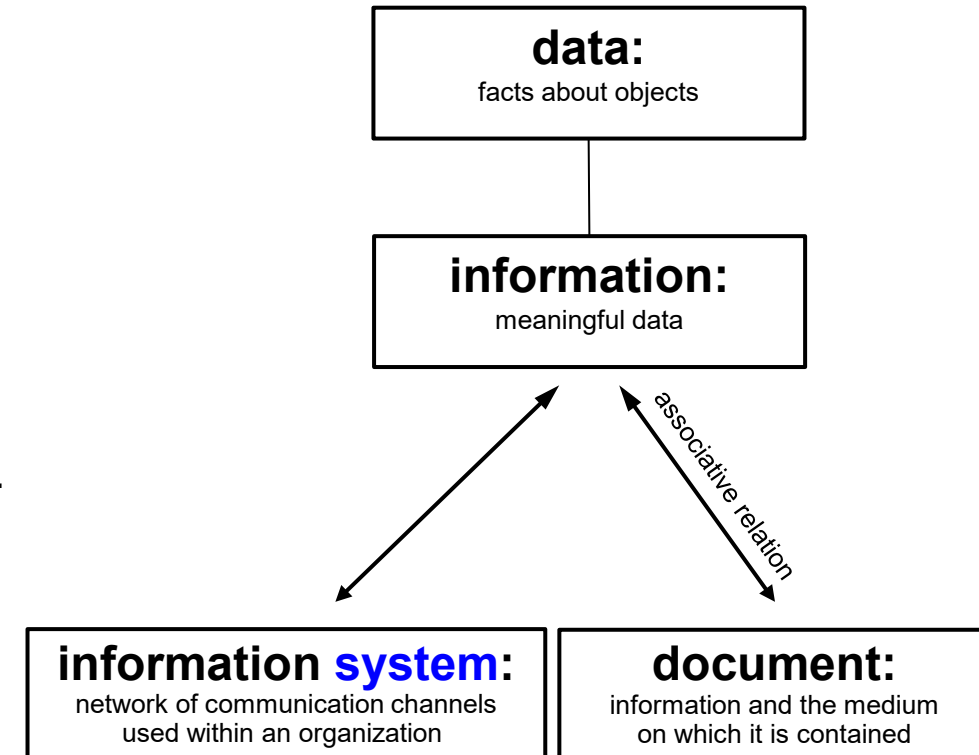
- Dialogue partners jointly perform reasoning and conclude



# Translation and Innovation

## Translator uses conceptualisation

- Translators perform translation,
  - a dialogue-based semiotic process.
- Translators perform conceptualisation,
  - identifying and documenting relevant concepts,
    - e.g. based on standards.
  - right: excerpt from a concept diagram in DIN EN ISO 9000.

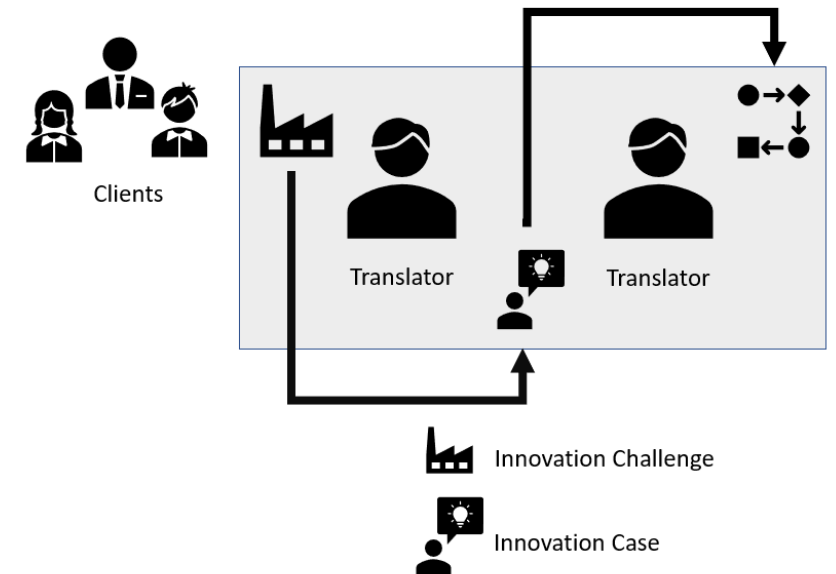




# FAIR Translation and Innovation

## OntoTranslator uses conceptualisation and is trained in ontologisation

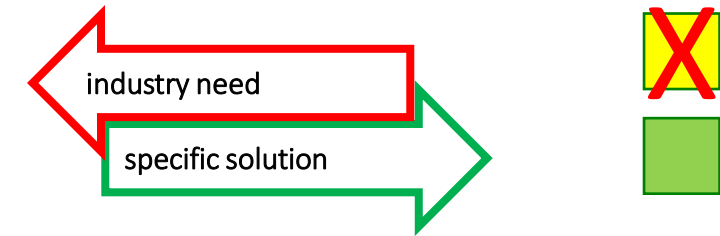
- Translators perform translation,
  - a dialogue-based semiotic process.
- Translators perform conceptualisation,
  - identifying and documenting relevant concepts,
  - e.g. based on standards.
- In OntoTrans they also are trained in ontologisation,
  - a further semiotic process.
  - This requires the expertise of an OntoTransLator.



# FAIR Translation and Innovation

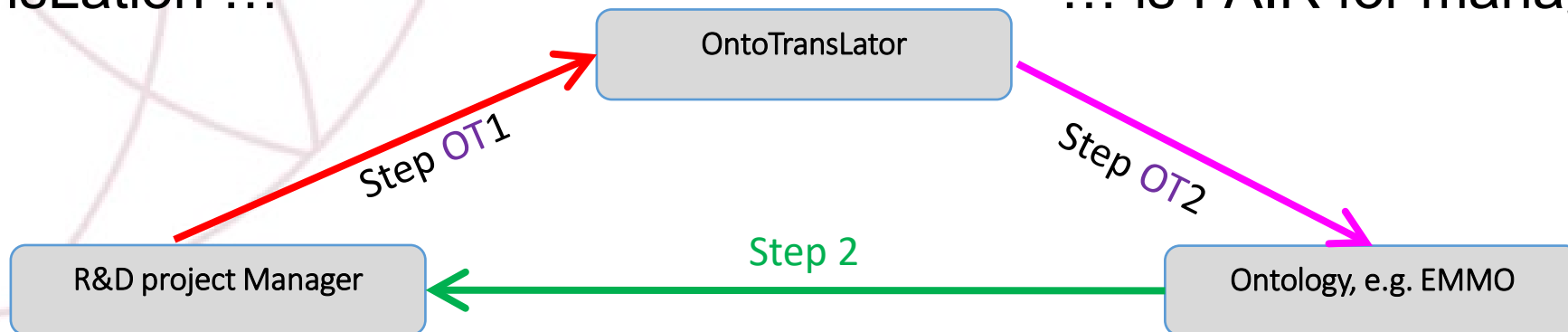
OntoTranslator uses semantic technologies (e.g. **ontologies**)

- Innovation in manufacturing



- OntoTransLation ...

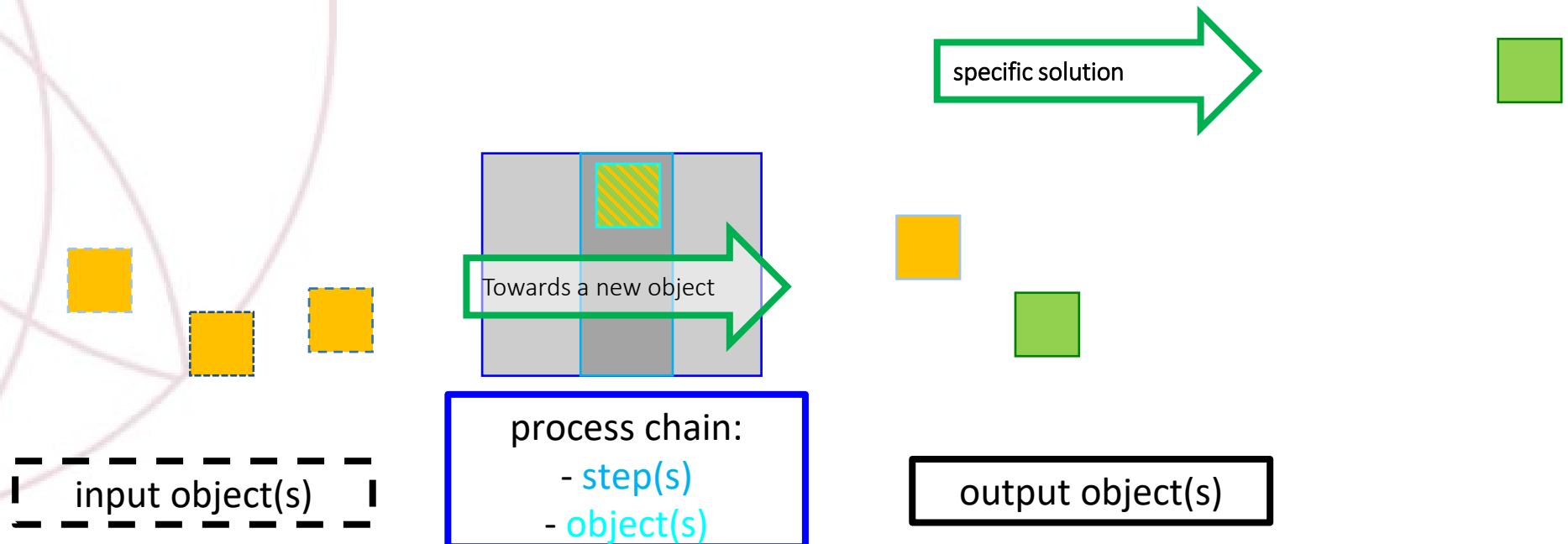
... is FAIR for managers



# FAIR Translation and Innovation

## OntoTranslator and manager „share“ concepts

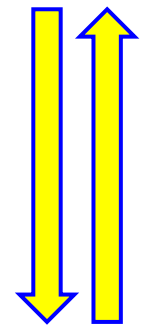
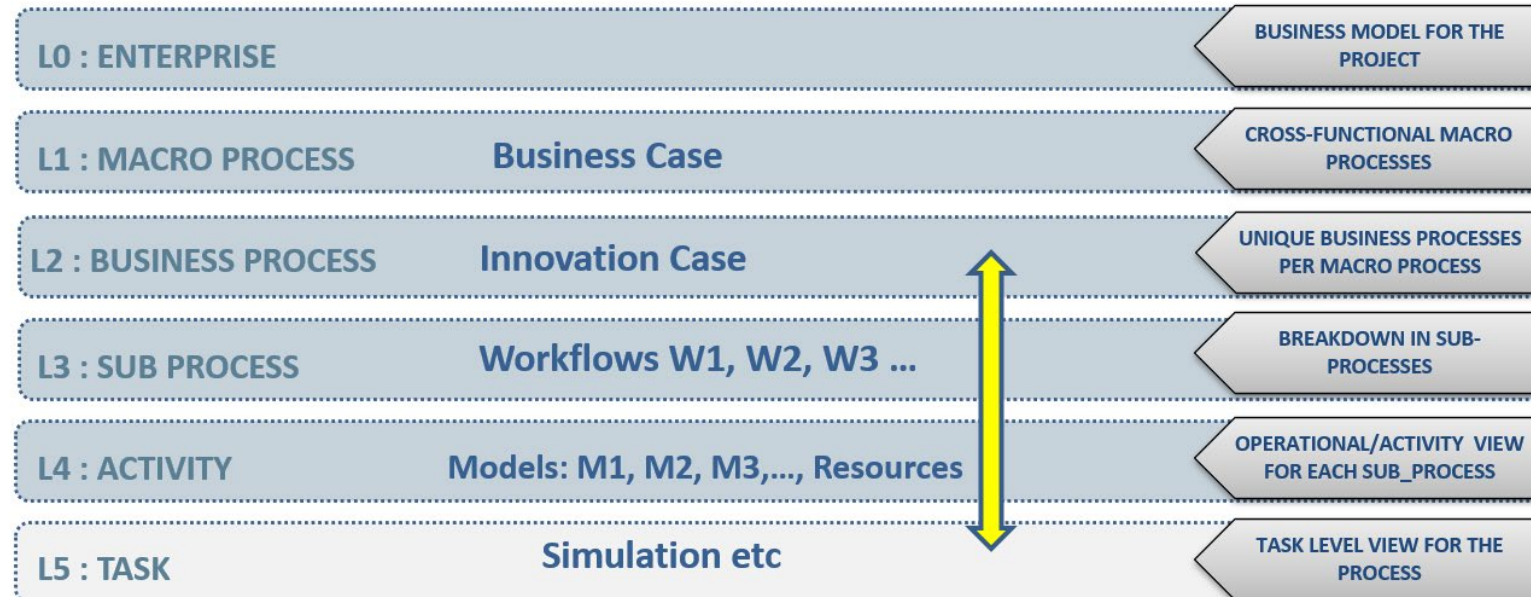
- Dialogue partners may opt for convention-based ontologisation,
  - e.g. in step OT1, Manager|Translator sketch their conceptualisation



# Innovation Cases in Organisations

## OntoTranslator and manager agree on project framework

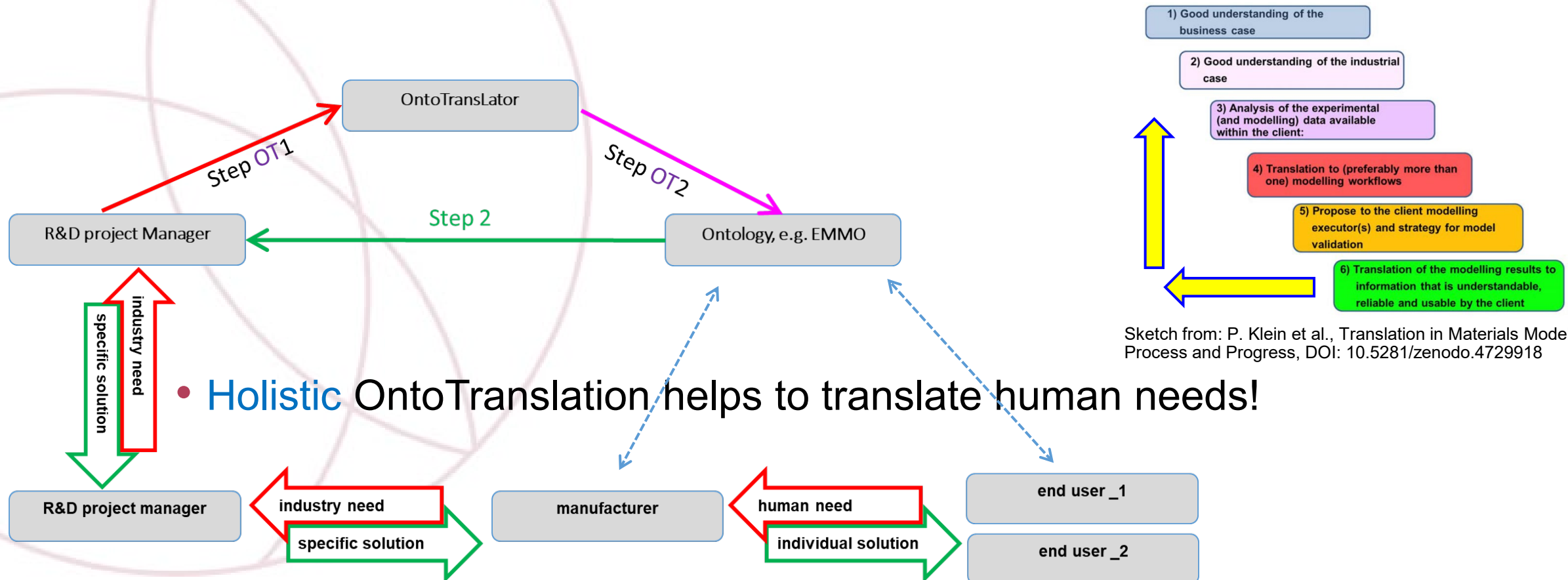
- in dialogue manager|translator
  - innovation-relevant options for changes are elaborated





# FAIR Translation and Innovation

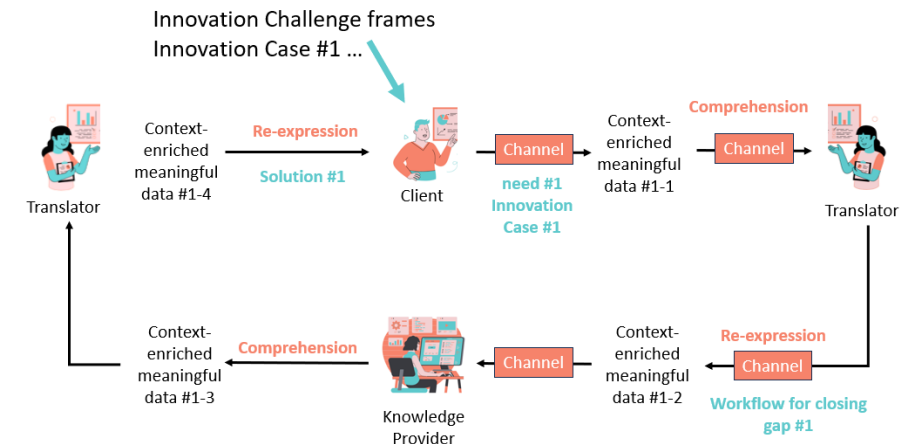
## OntoTranslator and manager cooperatively find a first solution



# Innovation Case in Ontology

## OntoTranslator formalises Manager|Translator's conceptualisation

- following dialogue manager|translator, the OntoTranslator (team)
  - integrates objects and processes of the innovation case
    - with a FAIR framework provided with an ontology
  - realises the perspective used by the Manager
    - greatly profiting from guidance by a multi-perspective ontology, e.g. EMMO
  - links conceptualisation with (e.g. perspective-specific) ontology branch
    - concepts are related to appropriate ontological classes (in a persistent form)
    - interactions are related to ontological relations
    - individuals are related to ontological entities/things
  - clears the way for an integrated model-centric engineering approach





*Thank  
you!*



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