

# OntoTrans

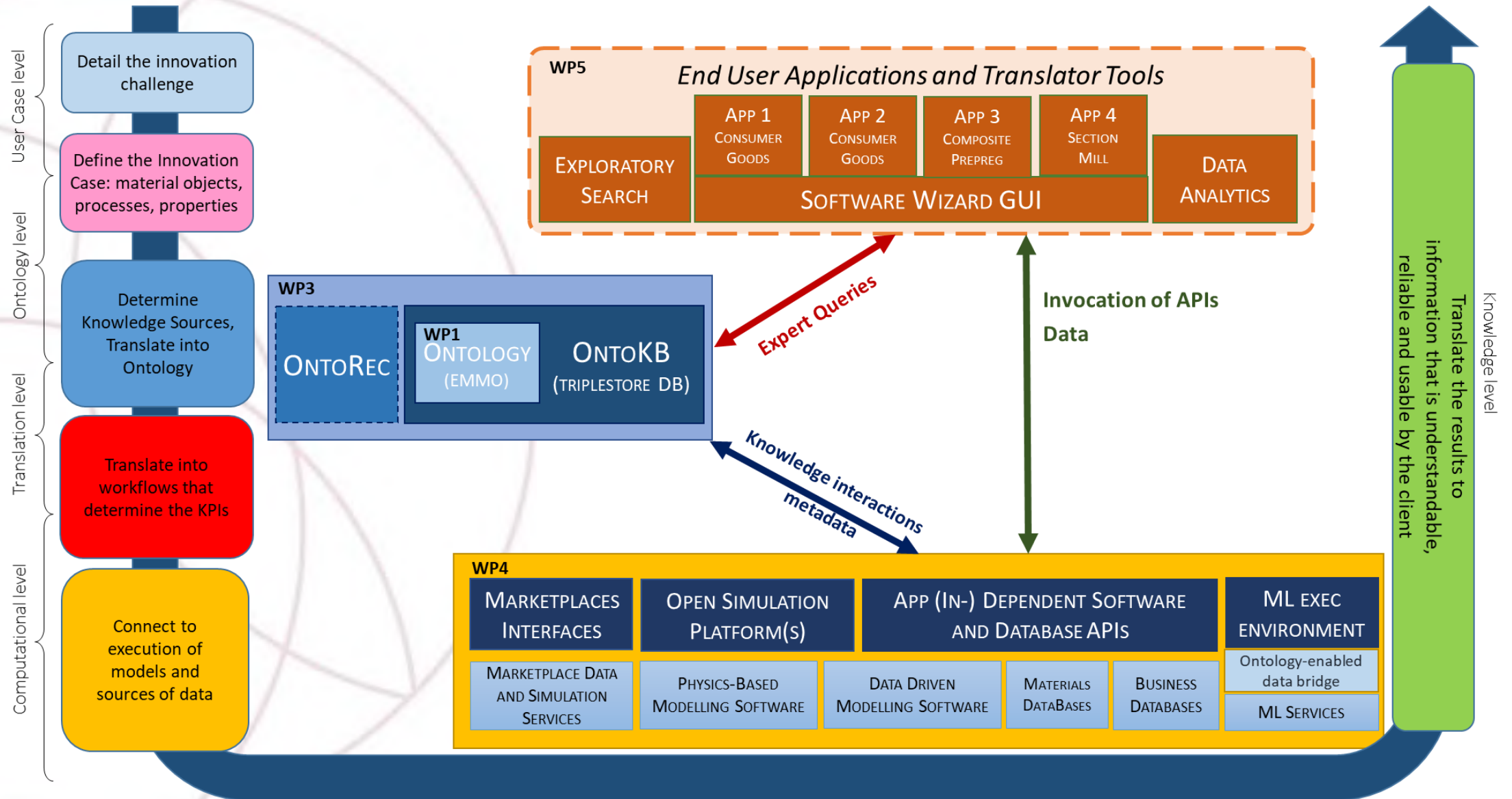
## Translator Tools

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TU Wien-ISE

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# Tools for Translators

## Aims

- Further develop translator guidelines
- Bring evidence for best practices
- Ontologies to represent manufacturing challenges
- Build a semantic database of cases
- Learn from previous experiences
- Share knowledge semantically

# Tools for Translators

- Common Graphical Framework
- Exploratory Search System (ESS)
- Data Analytics

# Common Graphical Framework

## Use Case GUI development

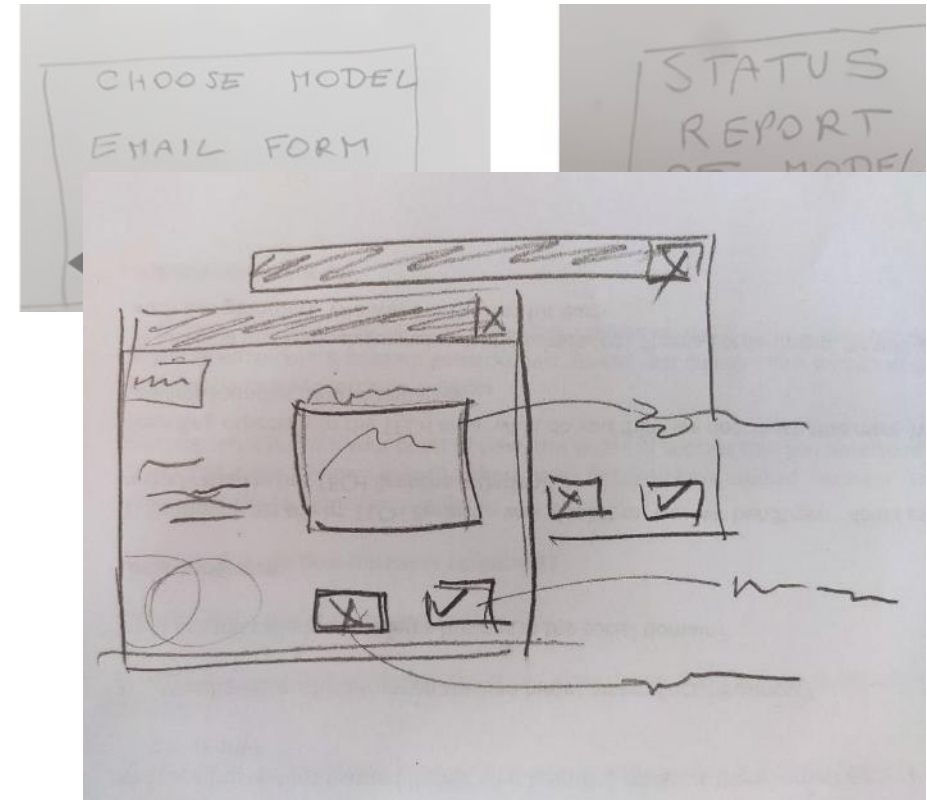
- For each industrial application case
- User-friendly interfaces and use case dependent features:
  - Interfacing with OSP
  - Reasoning on data
  - Querying and browsing the data
  - Performing Data Analytics



# Common Graphical Framework

## Use Case GUI development

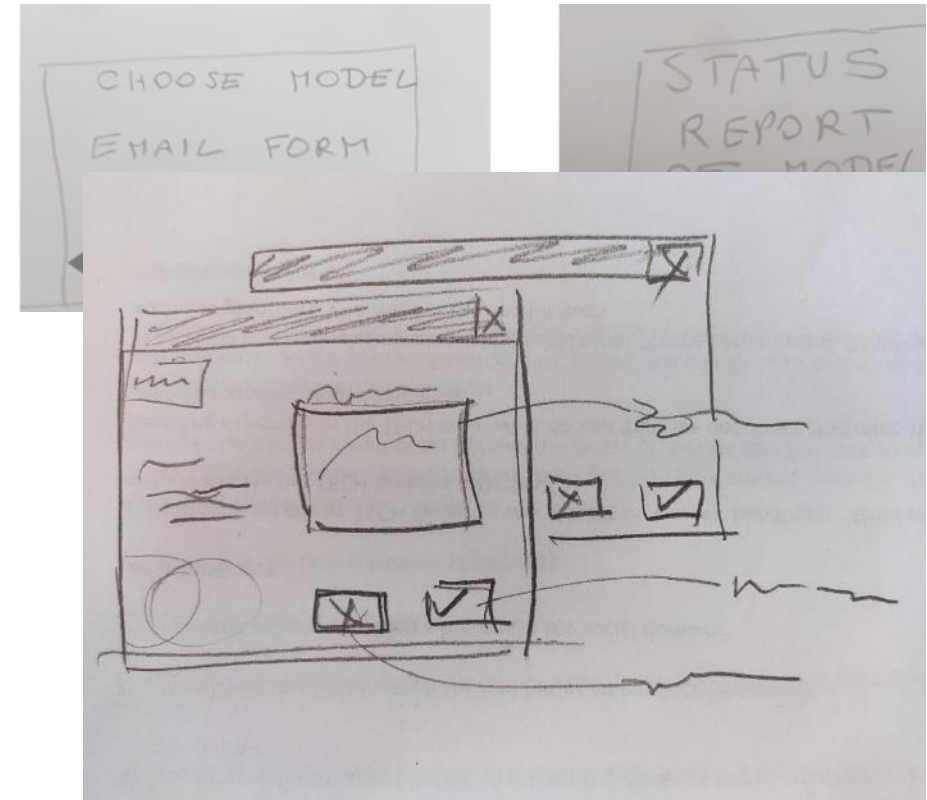
- For each industrial application case
  - customized workflow-based interface-wizard
  - non-expert users
  - (easy) starting point
  - case control interface for specific requirements



# Common Graphical Framework

## Use Case GUI development

- Collected requirements:
  - Pre-defined modules (for each use case)
  - Sequences of screens for user interactions
  - Web-based
  - APIs to and responses from
    - OntoKB, OntoRec
    - virtual MMM, Virtual BDSS
    - ESS, Analytics tools
- (these are only a few)



# Common Graphical Framework

## Design prototype



### TO SOLVE YOUR INNOVATION CHALLENGE

- Smart guidance through the whole steps of the translation process
- ESS - Exploratory Search System to discover and explore available knowledge
- OntoRec - Ontology-based Recommendation System for decision support in modelling
- OntoKB - Semantic knowledge base system to ensure fast access to data, e.g. models and workflows



ESS



Data analysis



Login

## Select your Innovation Challenge



### Detergent Pouch Launch Analysis

Fast analysis of large datasets to assess in-market initiative success. KPI's include product and package attributes, e.g. the presence of product on the shelf and pricing.



### Detergent Pouch Systems

Reach a more integrated, digital design and development. KPI's include: consumer preference, product's performance, processability and safety, interaction of chemistry with package and sustainability.



### Composite Prepreg Process optimisation

Understanding the process and developing an R&D strategy to manufacture composite laminates with low porosity and suitable mechanical properties.



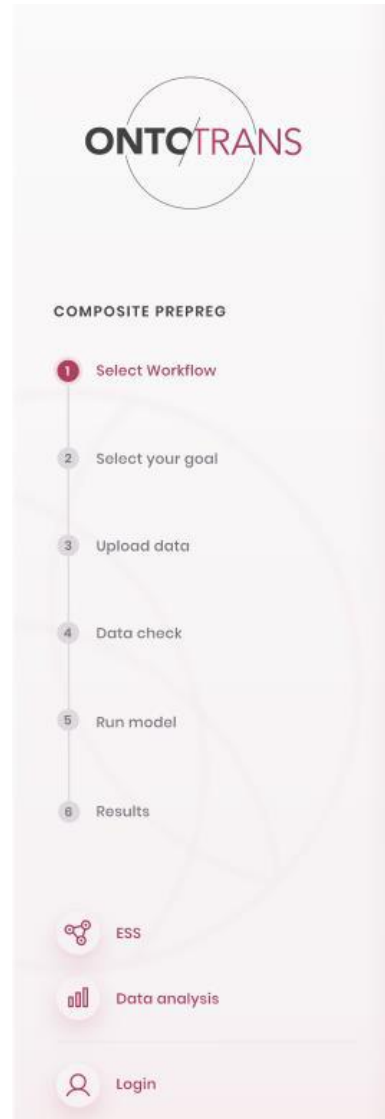
### Section Mill Process optimisation

Digital tools and models to predict the performance of thermomechanical subprocesses of the beam rolling section mill reducing the cost and risk of production, minimising defects, and enabling the introduction of new products

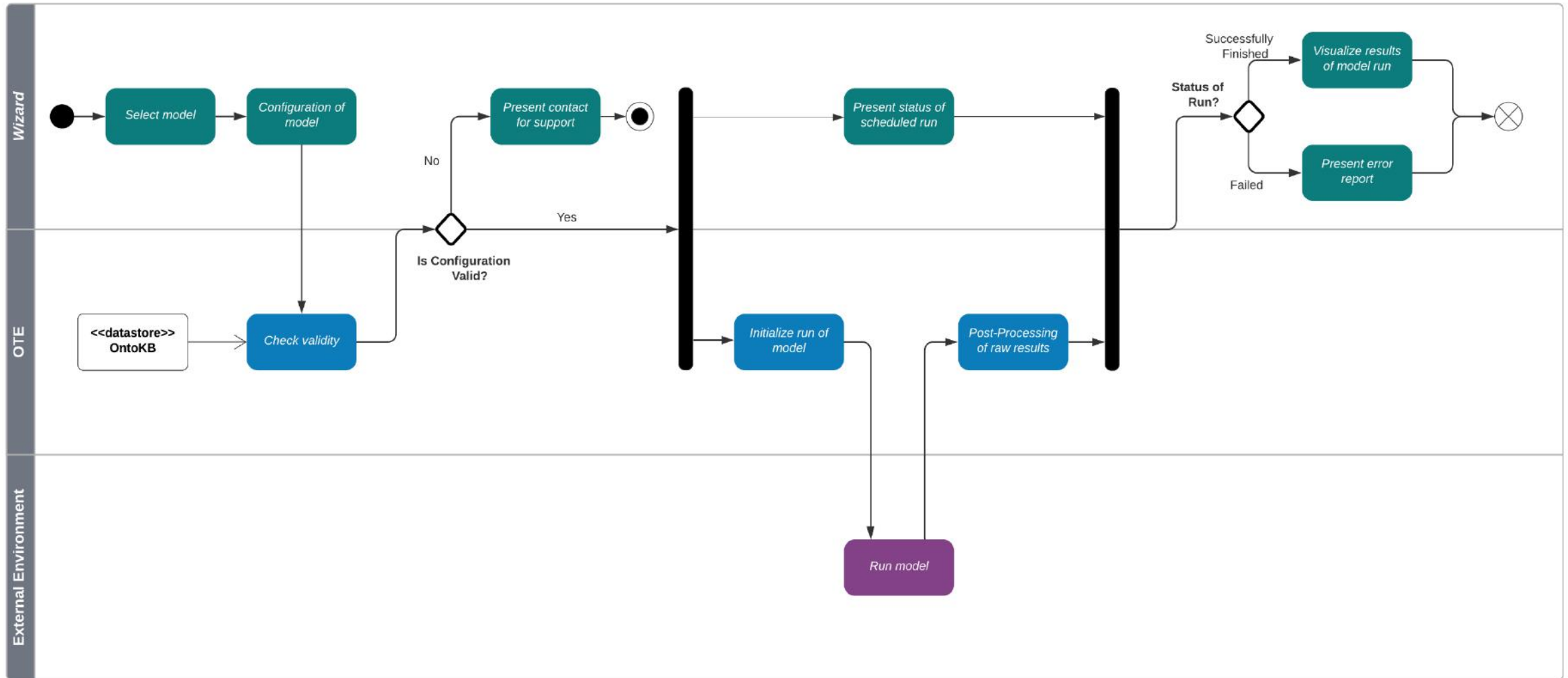


# Common Graphical Framework

Design prototype



# Common Graphical Framework

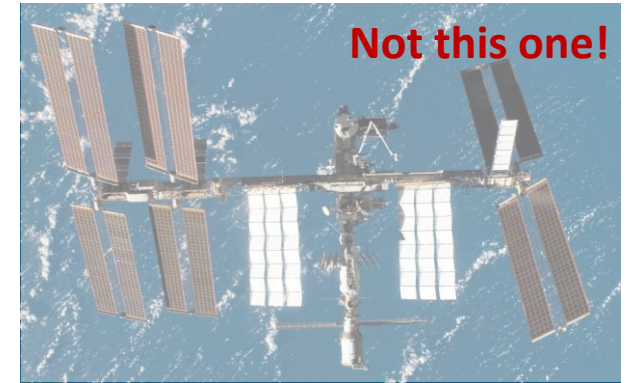


# Tools for Translators

- Common Graphical Framework
- Exploratory Search System (ESS)
- Data Analytics

# Exploratory Search System (a.k.a. ESS)

What is Exploratory Search?



# Exploratory Search System (a.k.a. ESS)

## What is Exploratory Search?

- Traditionally search:
  - query-response oriented
  - Good for well-defined information need / goal

Task

*What is the longest river in South America?*

longest river south america

www.eniscuola.net › mediateca › 1...

**10 longest rivers in south America - Eniscuola**

10 longest rivers in south America. e-learning. E-learning. To inform younger students about Energy and Environment, Science, Chemistry, English culture and ...

blogpatagonia.australis.com › long...

**What is the longest river in South America?**

17.10.2017 — South America boasts no shortage of great rivers. - Stretching somewhere between 6,400 and 6,992 kilometres, the Amazon is South America's ...

en.wikipedia.org › wiki › Amazon...

**Amazon River - Wikipedia**

The Amazon River in South America is the largest river by discharge volume of water in the world, and the disputed second longest river in the world.

Origin of the name - History - Course - Watershed

en.wikipedia.org › wiki › List\_of\_...

**List of rivers by length - Wikipedia**

This is a list of the longest rivers on Earth. It includes river systems over 1,000 kilometres (620 ... River was rejuvenated by much of its lower course being removed, likeliest when Africa split from South America when Gondwanaland broke up ...

Definition of length - List of river systems... - Notes - River systems that may...

13

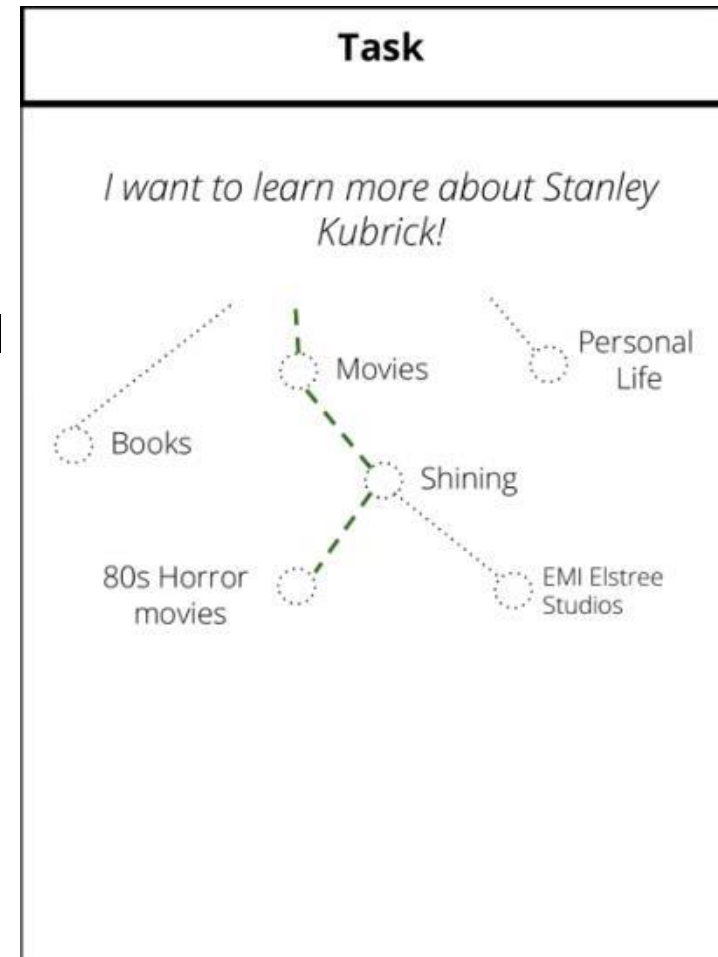
15.03.2022



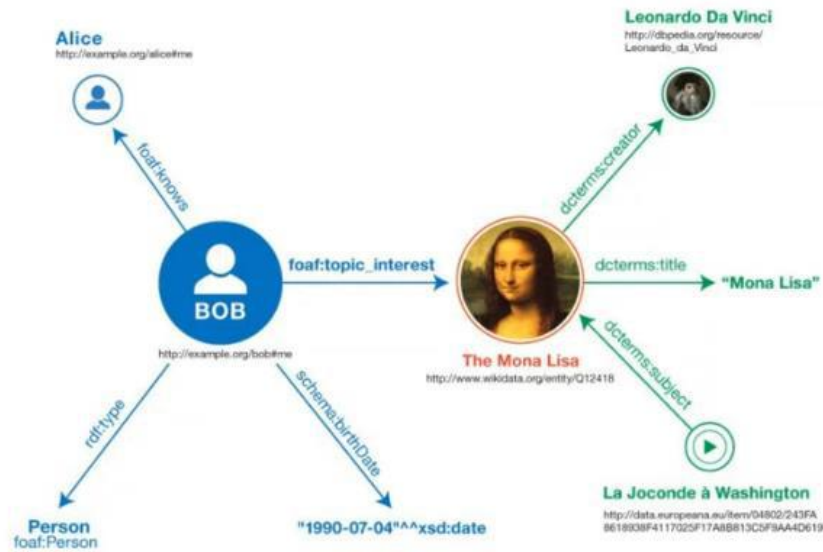
# Exploratory Search System (a.k.a. ESS)

## What is Exploratory Search?

- Traditionally search
  - query-response oriented
  - Good for well-defined information need / goal
- Exploratory Search:
  - Enable information seeking tasks
  - Learning, investigating
  - Increased level of interaction with the data!

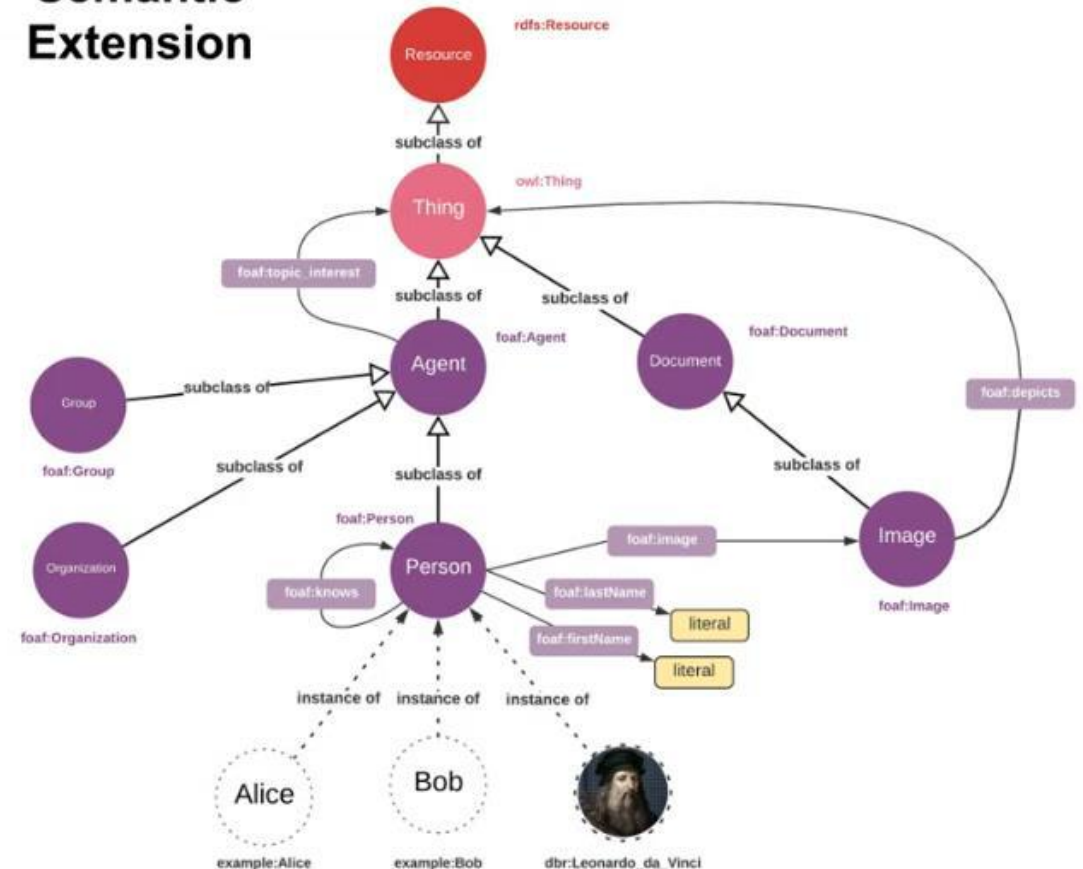


# Exploratory Search on Knowledge Graphs

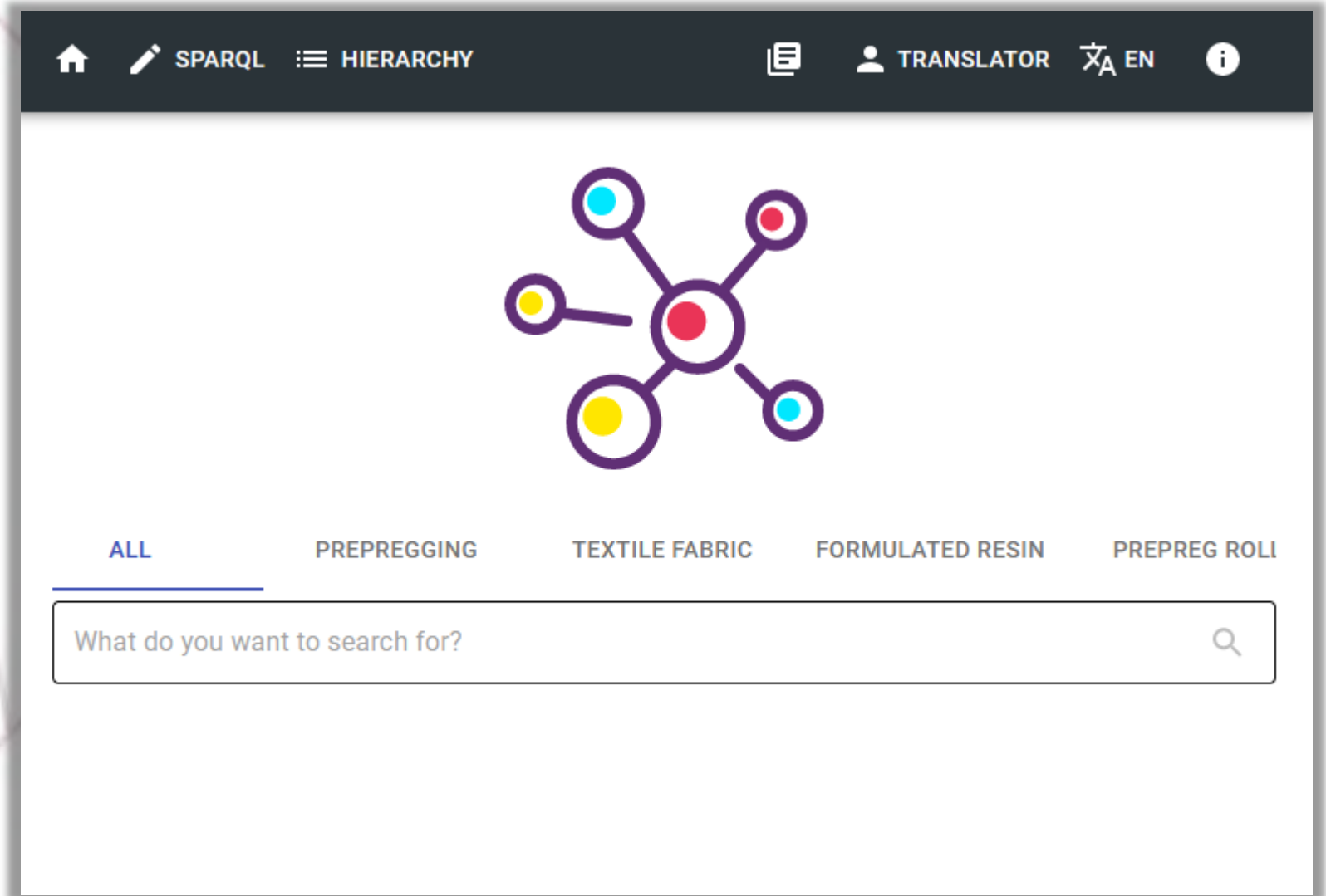


RDF Graph

## Semantic Extension



# Exploratory Search System



# Exploratory Search System

```

5971 #####
5972 # Classes
5973 #####
5974
5975 ### http://semantic-systems.org/ess/ontotrans/app3#CuringStep
5976 :CuringStep
5977   rdf:type      owl:Class ;
5978   rdfs:label    "Curing Step" ;
5979   rdfs:comment  "a curing step of a prepregging" .
5980
5981
5982 ### http://semantic-systems.org/ess/ontotrans/app3#FormulatedResin
5983 :FormulatedResin
5984   rdf:type      owl:Class ;
5985   rdfs:subClassOf ce:EMMO_d7df517c_b14a_477b_a0ad_4579cf35d052 ;
5986   rdfs:label    "Formulated Resin" ;
5987   rdfs:comment  "a formulated resin" .
5988
5989
5990 ### http://semantic-systems.org/ess/ontotrans/app3#ManufacturingMethod
5991 :ManufacturingMethod
5992   rdf:type      owl:Class ;
5993   rdfs:label    "Manufacturing Method" ;
5994   rdfs:comment  "a manufacturing method" .
5995
5996
5997 ### http://semantic-systems.org/ess/ontotrans/app3#PrepregRoll
5998 :PrepregRoll
5999   rdf:type      owl:Class ;
6000   rdfs:subClassOf ce:EMMO_45ed7ba3_f68c_416c_8fdb_397992c5d7dc ;
6001   rdfs:label    "Prepreg Roll" ;
6002   rdfs:comment  "a prepreg roll resulting from a prepregging" .
6003
6004
6005 ### http://semantic-systems.org/ess/ontotrans/app3#Prepregging
6006 :Prepregging
6007   rdf:type      owl:Class ;
6008   rdfs:subClassOf ce:EMMO_9df141d9_aee1_469f_989a_9d35dbf98528 ;
6009   rdfs:label    "Prepregging" ;
6010   rdfs:comment  "a prepregging process" .
6011
6012
6013 ### http://semantic-systems.org/ess/ontotrans/app3#TextileFabric
6014 :TextileFabric
6015   rdf:type      owl:Class ;
6016   rdfs:subClassOf ce:EMMO_c41436ae_1a8b_4445_8c15_733279619ae2 ;
6017   rdfs:label    "Textile Fabric" ;
6018   rdfs:comment  "a textile fabric" .

```

Home
SPARQL
HIERARCHY
TRANSLATOR
EN

×

Q

ALL
PREPREGGING
TEXTILE FABRIC
FORMULATED RESIN
PREPRI

39 results (48 milliseconds)

### Fabric 2

Textile Fabric

Description of Fabric 2

### Textile Fabric

Class

a textile fabric

### Fabric Density

DatatypeProperty - Thing

the density of a textile fabric

### Fabric 2

Textile Fabric

Description of Fabric 2

**Fabric Density:** 0.2 g/cc

**Fabric Thickness:** 970 microns

**Fabric Melting Point:** 1260 °C

**Fabric Type:** Ceramic

Related textile fabrics

# Exploratory Search System

Home ALL Search ... HIERARCHY TRANSLATOR EN

```

2 PREFIX dcat: <http://www.w3.org/ns/dcat#>
3 PREFIX dcterms: <http://purl.org/dc/terms/>
4 PREFIX demo: <http://semantic-systems.org/ess/ontotrans/app4#>
5 PREFIX emmo: <http://emmo.info/emmo#>
6 PREFIX ex: <http://semantic-systems.org/ess/ontotrans/app4-instance/>
7 PREFIX foaf: <http://xmlns.com/foaf/0.1/>
8 PREFIX mfg: <http://emmo.info/emmo/middle/manufacturing#>
9 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
10 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
11 PREFIX skos: <http://www.w3.org/2004/02/skos/core#>
12 PREFIX xsd: <http://www.w3.org/2001/XMLSchema#>
13
14 SELECT * WHERE {
15   ?s ?p ?o .
16 } LIMIT 10
  
```

QUERY

Home ALL Search ... SPARQL TRANSLATOR EN

## CLASSES

Classes

- ☒ ImageObject
- ☒ Resource
- ☒ EMMO\_45ed7ba3\_f68c\_416c\_8fdb\_397992c5d7dc
- ☒ EMMO\_c41436ae\_1a8b\_4445\_8c15\_733279619ae2
  - ☒ Textile Fabric
    - ☒ Nothing
  - ☒ PersonalProfileDocument
  - ☒ Property
  - ☒ Agent
  - ☒ EMMO\_9df141d9\_aee1\_469f\_989a\_9d35dbf98528
  - ☒ Concept
  - ☒ Image
  - ☒ EMMO\_d7df517c\_b14a\_477b\_a0ad\_4579cf35d052
  - ☒ Group
  - ☒ Agent
  - ☒ Thing
    - ☒ Curing Step
    - ☒ Location
    - ☒ Class

### Textile Fabric

Class

a textile fabric

Parent

Class: EMMO\_c41436ae\_1a8b\_4445\_8c15\_733279619ae2

Examples

Fabric 4	Fabric 7	Fabric 5	Fabric 3
Textile Fabric	Textile Fabric	Textile Fabric	Textile Fabric
Description of Fabric 4	Description of Fabric 7	Description of Fabric 5	Description of Fabric 3



# Tools for Translators

- Common Graphical Framework
- Exploratory Search System (ESS)
- **Data Analytics**

# Data Analytics Tool

## ○ Goals:

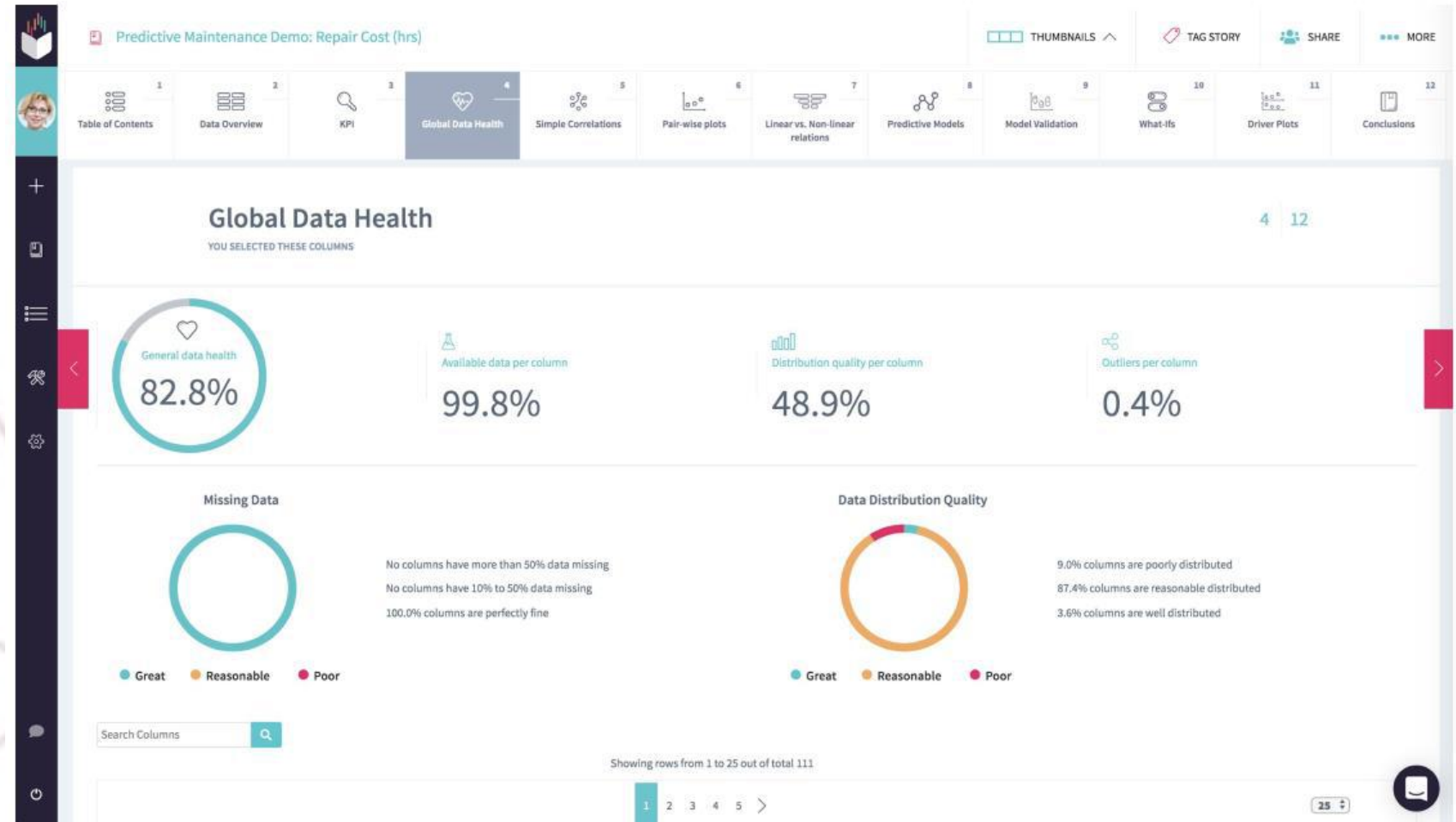
- Employ qualitative and quantitative data analysis methods to extract further insights, find patterns, observe trends.
- Provide enriched context to the Exploratory Search System
- Adapt Data Science methods to the specific Use Cases in OntoTrans
- Deliver prototypes and guidelines for Data Analytics

# Data Analytics Tool

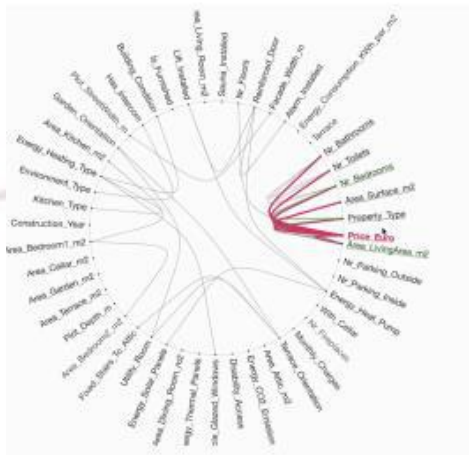


# Data Analytics Tool

## Automatic data quality analysis



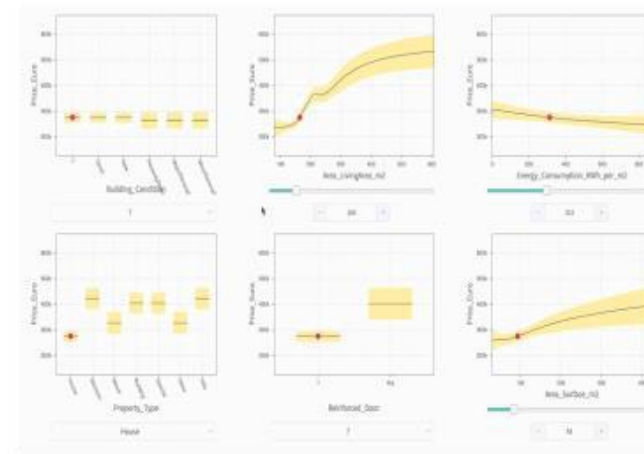
# Data Analytics Tool



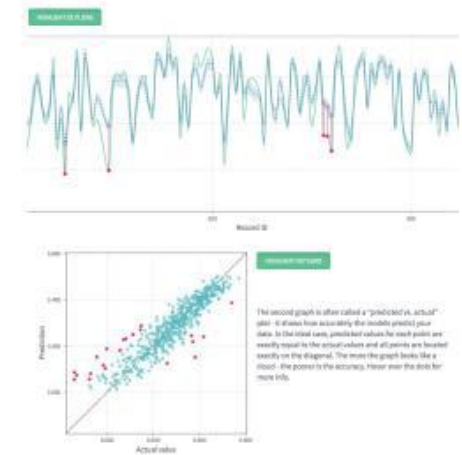
How is everything interconnected?



From all inputs, which are the dominant ones?



What should I do to get better results?  
What is the next best actions to get the desired result?



What are the exceptions to the rules?



- Common Graphical Framework
- Exploratory Search System (ESS)
- Data Analytics

*Thank  
you!*



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