KNOWLEDGE ORGANISATION AND TERMINOLOGY: APPLICATION TO CORK

THESIS DEFENCE

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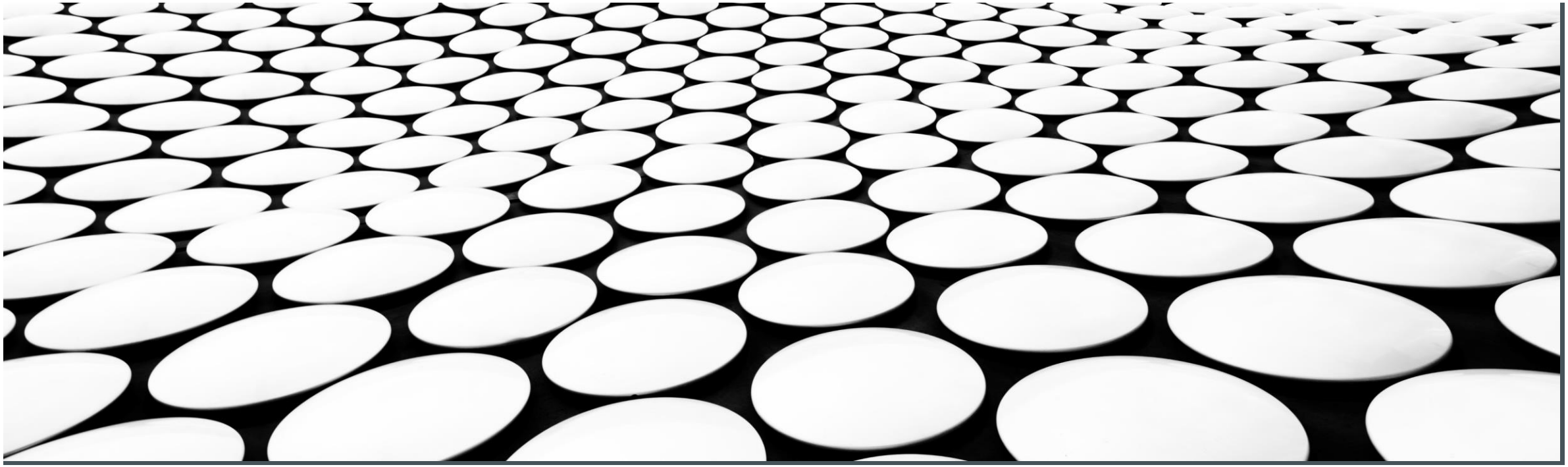

PURPOSE AND SUPERVISION OF THE THESIS

Thesis defence to fulfil the requirements for obtaining the double doctorate degree in

Linguistics : specialisation in Lexicology, Lexicography and Terminology

NOVA FCSH
FACULDADE DE CIÊNCIAS SOCIAIS E HUMANAS
UNIVERSIDADE NOVA DE LISBOA

and

Information and Communication Sciences

ÉCOLE DOCTORALE
SISEO
UNIVERSITÉ SAVOIE
MONT BLANC

Under the co-supervision of Professor Rute Costa (NOVA FCSH) and Professor Christophe Roche (LISTIC USMB)

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- Professor Frieda Steurs, Katholieke Universiteit Leuven and INT Leiden (Institute for the Dutch language)
- Professor Joana Paulo, Instituto Superior de Agronomia | Universidade de Lisboa (expert of the domain)

PRESENTATION

From the (1) linguistic and
(2) conceptual analysis
of textual DEFINITIONS,
to the building of a domain-ontology

Multimodal
TERMINOLOGICAL e-dictionary
- several resources linked

A starting point for building
ONTOLOGIES
and
KNOWLEDGE ORGANISATION

TOPICS OVERVIEW

Domain

Corpus

Text mining

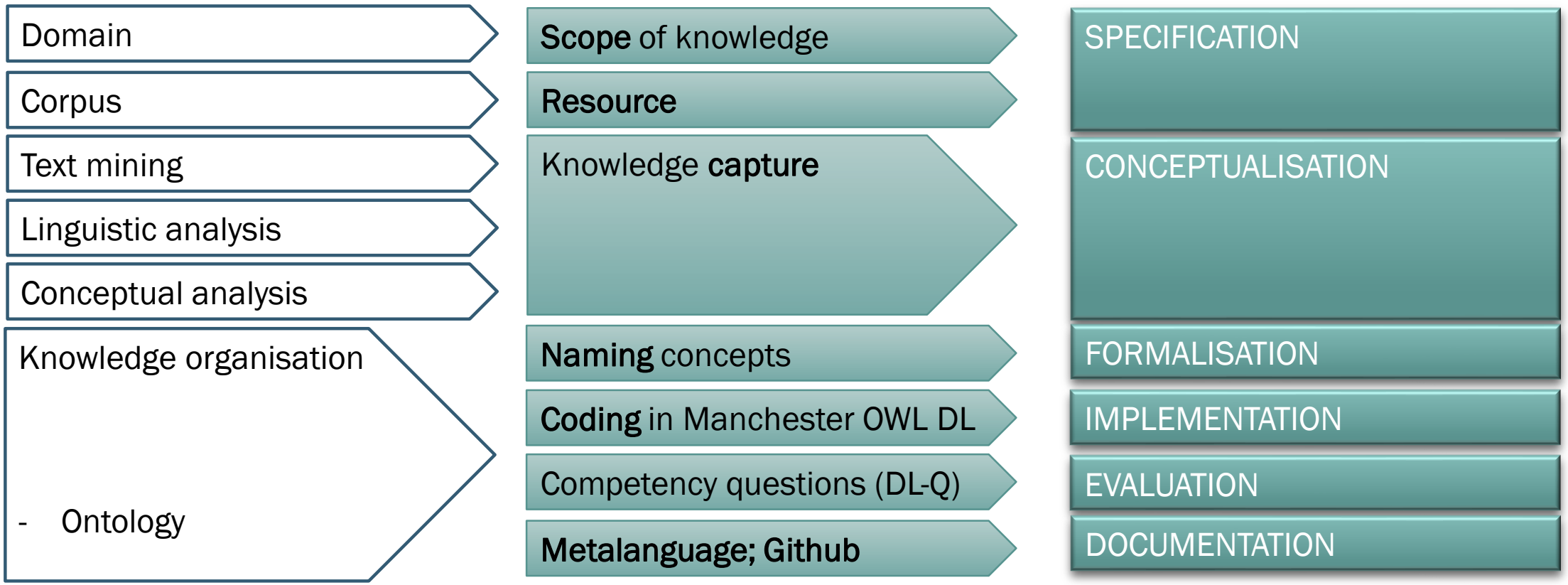
Linguistic analysis

Conceptual analysis

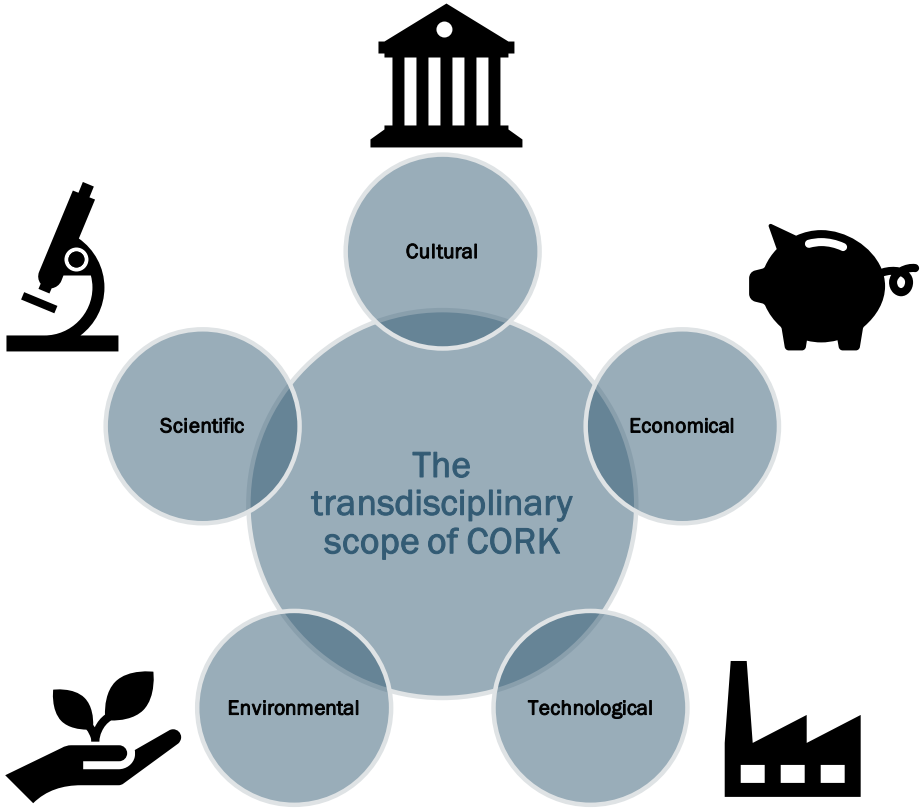
Knowledge organisation

Future work

ROADMAP OF TERMCORK FOLLOWING THE CLASSIC CYCLE TO BUILD AN ONTOLOGY



DOMAIN: CORK, A MULTIFACETED SCOPE OF INTERESTS



Cork oak forests have a high economic, social and environmental value in Portugal

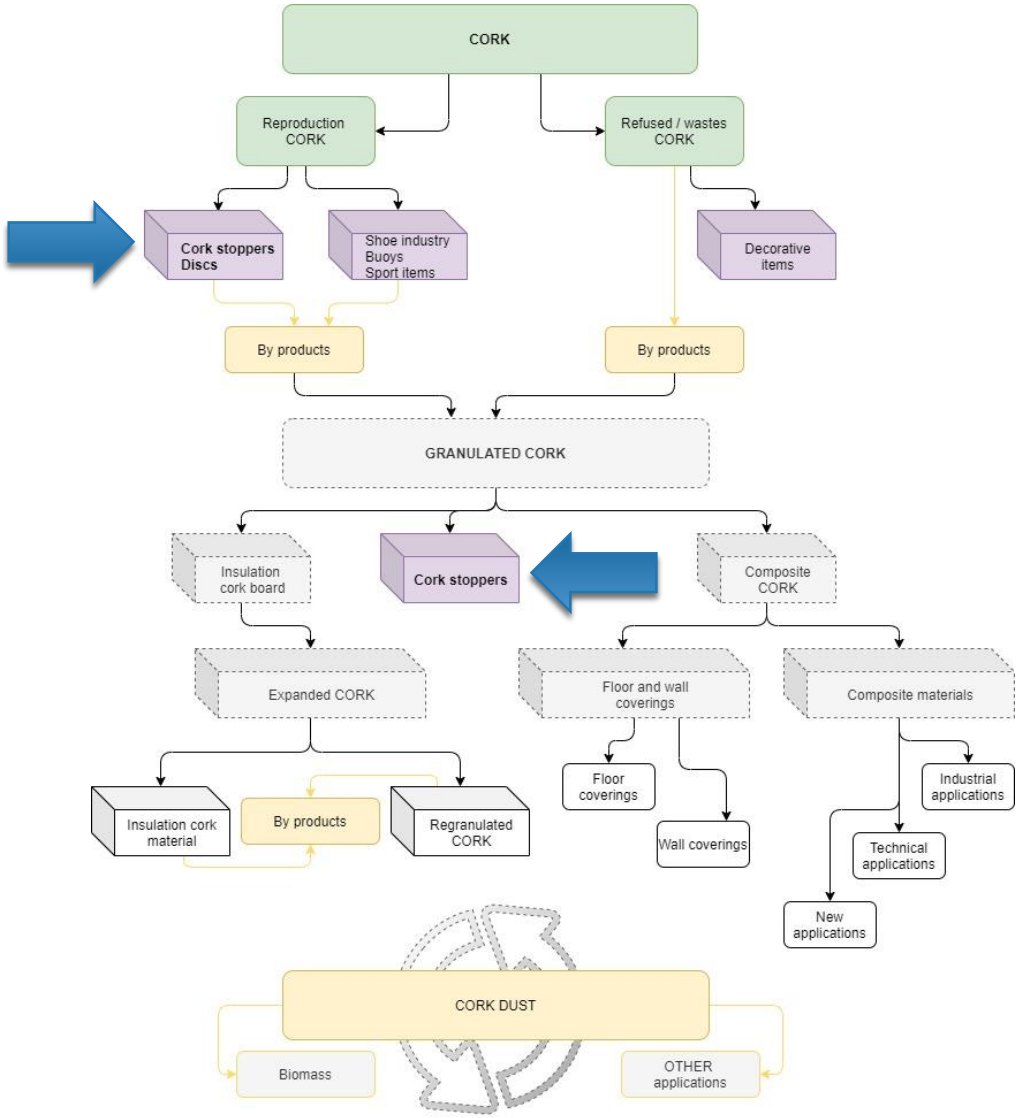
- ✓ Production ("montados")
- ✓ Biodiversity and CO^2 capture
- ✓ **Transformation** (industry)
- ✓ Leader in the world ranking of international market shares

➔ An endless field of terminological study

THE SCOPE OF KNOWLEDGE: CORK STOPPERS

Scope of knowledge

- CORK STOPPERS, the backbone of the industry of cork
- Stoppers are submitted to several operations and finishing treatments

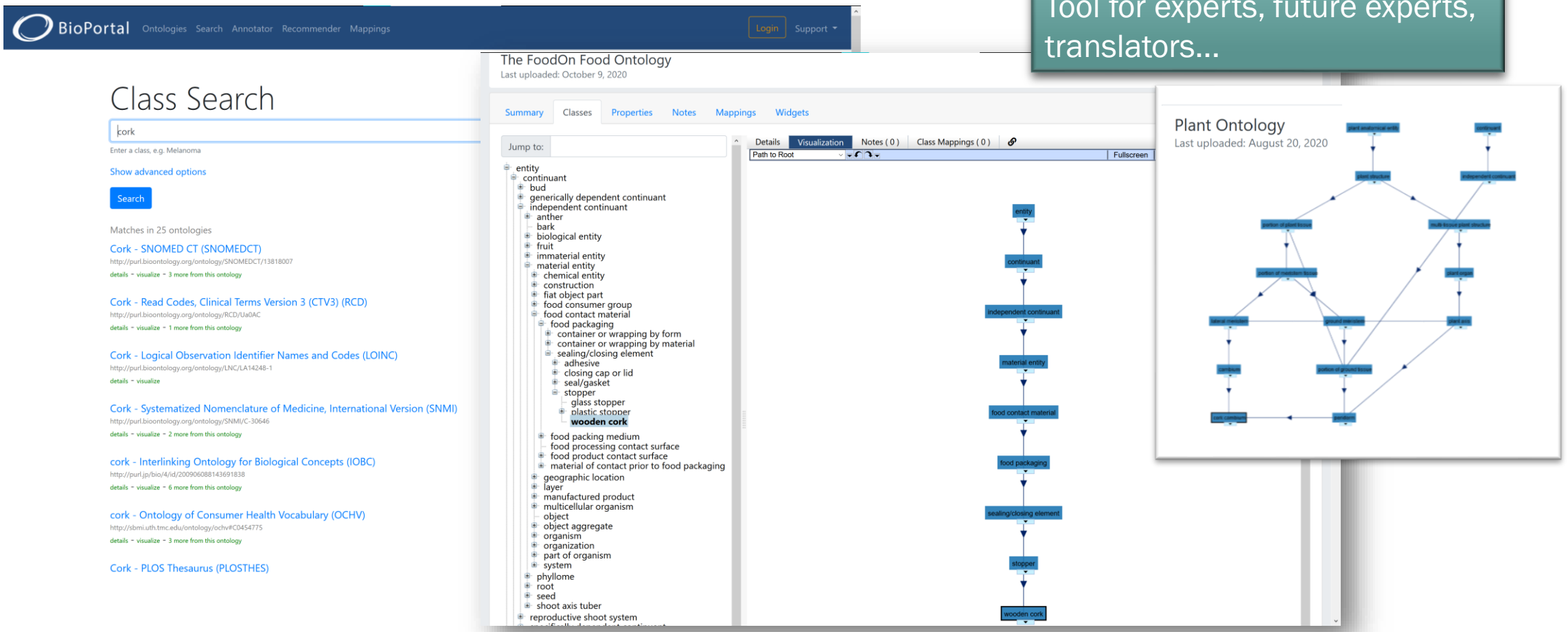


PURPOSE OF THIS STUDY: BUILDING AN ONTOLOGY FOR THE INDUSTRY OF CORK

Domain: cork

Scope of knowledge

Purpose:
Tool for experts, future experts, translators…



A CORPUS BUILT FROM SCRATCH AS A RESOURCE TO GRASP EXPERTS' CONCEPTUALISATIONS

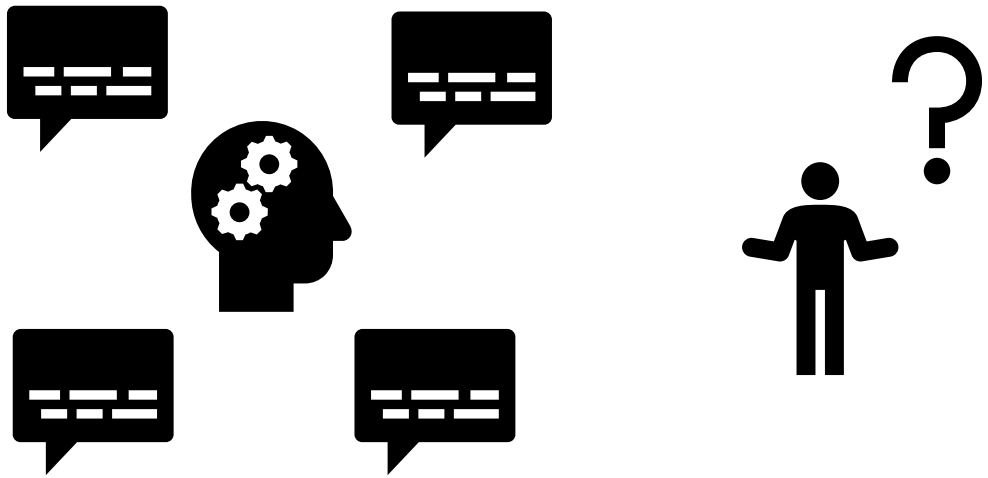
Domain: cork

Cork Corpus

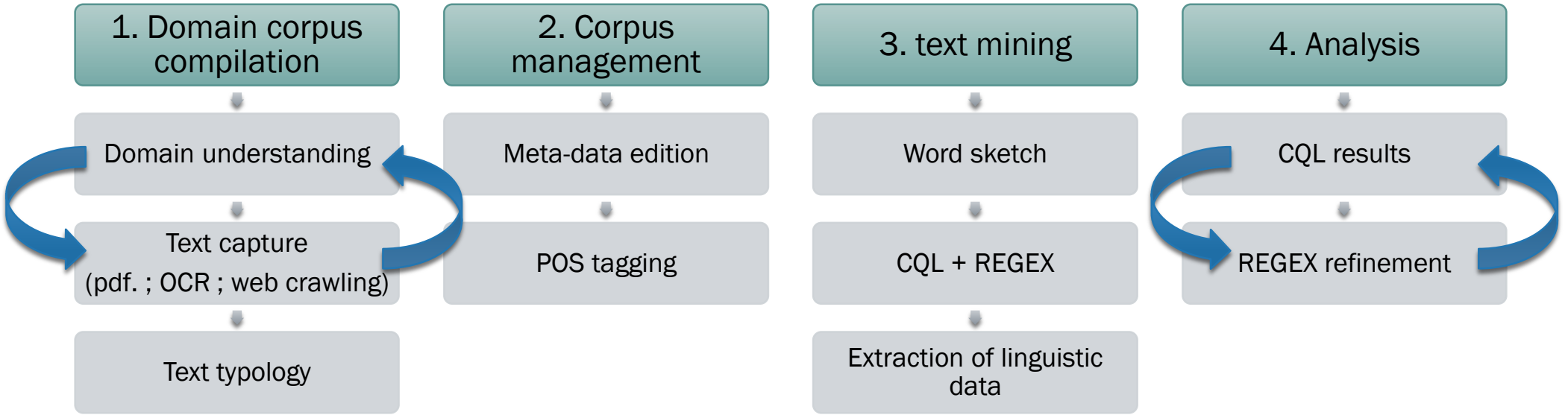
Scope of knowledge: stoppers

Non-ontological **resource**

SPECIFICATION

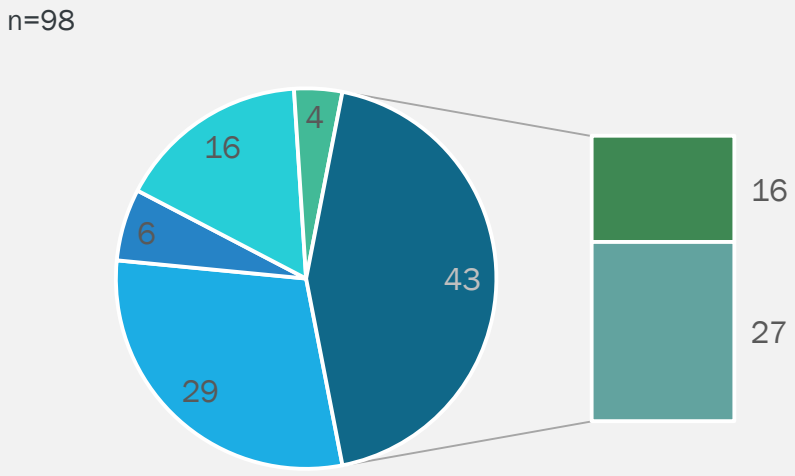


CORPUS BUILDING AND PROCESSING: OVERVIEW



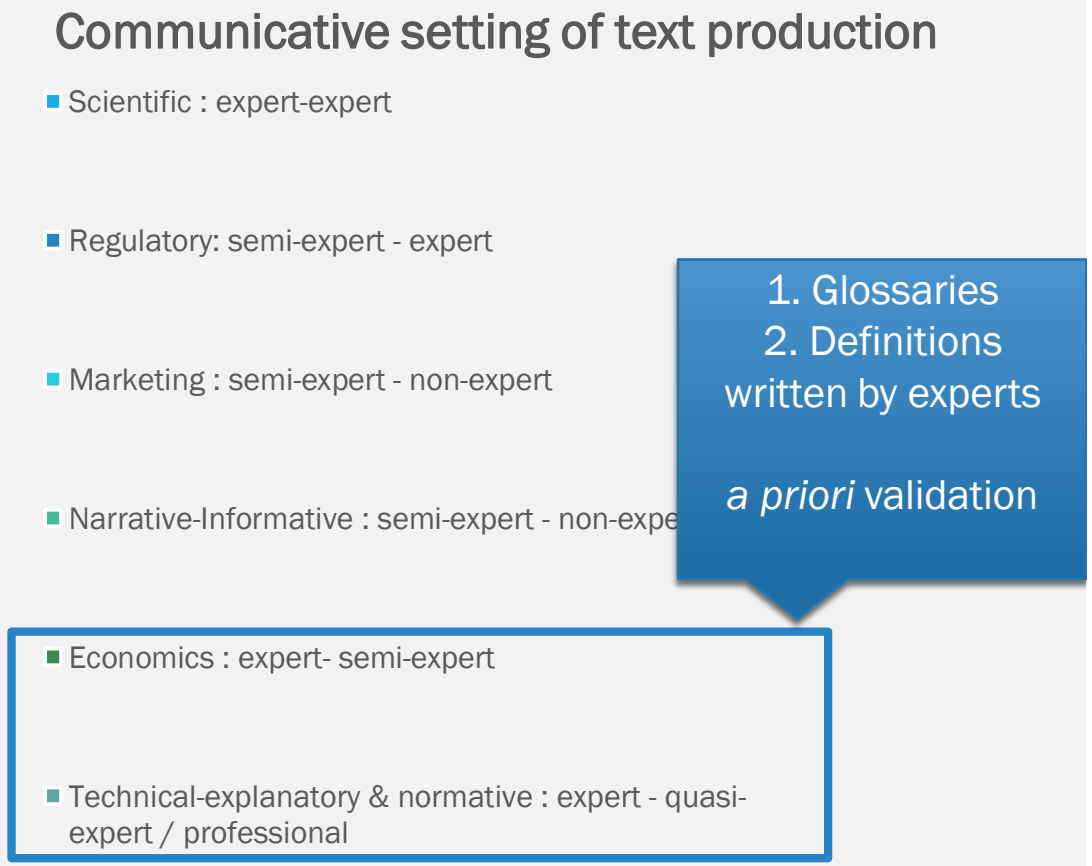
THE CORPUS OF ANALYSIS

The more significant the knowledge gap between the author-expert and his audience, the more definitions and contextual definitions are observed in specialised texts



corpus of analysis = 43 texts

Remaining texts = reference corpus



1. Glossaries
2. Definitions written by experts

a priori validation

TEXT MINING: THE 1ST TASK OF KNOWLEDGE CAPTURE (ONTOLOGY'S CYCLE)

TEXT MINING STRATEGIES: AN ITERATIVE PROCESS

Nº	CQL construct	hits
1	[word="[[:upper:]]*"][tag="Fd.*"]	614
2	[word="[[:upper:]]*"&(lemma="rolha.*")][tag="Fd.*"]	21
3	[word="[[:upper:]]*"&(lemma="rolha.*")][]{0,6}[tag="Fd.*"]	208
4	"rolha"[(tag="V.P.*")|(tag="A.*")]	148
5	"rolha"[(tag="V.P.*SF")|(tag="A.*")]	165
6	"rolha"[tag="V.P.*SF"]	69
7	"rolha"[(tag="D.*")|(tag="S.*")]?[tag="A.*"]?"cortiça"?[]{0,4}"rolha"{0,4}[tag="V.P.*SF"]	167
8	"rolha"[(tag="D.*")|(tag="S.*")]?"cortiça"[]{0,4}"rolha"[]{0,4}[tag="V.P.*SF"]	26

Rolha de cortiça aglomerada por moldagem : rolha obtida

1 of the KWIC matched with CQL8

ROLHA DE CORTIÇA NATURAIS E AGLOMERADAS	[agglomerated and natural cork stopper]
ROLHAS	
ROLHAS DE CORTIÇA	
ROLHAS DE CORTIÇA NATURAL	
ROLHAS DE CORTIÇA AGLOMERADA	
ROLHAS LAVADAS	
ROLHA	[glued stopper]
ROLHA BOLEADA	[colmated stopper]
ROLHA CHANFRADA	[stopper with hat]
ROLHA COLADA	[simulated stopper]
ROLHA COLMATADA	[washed stopper]
ROLHA DE FLANGE	[marked stopper]
ROLHA DE IMITAÇÃ	[mixt stopper]
ROLHA LAVADA	[side surface sanded stopper]
ROLHA MARCADA	[rejected stopper]
ROLHA MISTA	[top polished stopper]
ROLHA PONÇADA	
ROLHAS REJEITADAS	
ROLHA TOPEJADA	

CQL4 was inspired on CQL3 results: N+VPP / ADJ

CQL7 evolved from CQL 6, but was also inspired on CQL 3 results:
N+ det + ADJ + ? +VPP

After CQL 6, we decided to match the structure of intensional definitions, where the generic term is repeated in the *definiens*

left-hand side context	KWIC	right-hand side context
Rolha de cortiça aglomerada com discos de cortiça natural:	rolha formada	por um corpo em cortiça aglomerada e um ou dois discos

WORD SKETCH AND TEXT MINING STRATEGIES COMBINED TO EXTRACT DEFINITIONAL CONTEXTS

- Contextual definitions and definitional contexts (descriptions)
- Recurrent patterns were observed in context:

Rolha *que* ***foi submetida a*** *um* ***tratamento químico*** *com o objectivo de desinfectar e/ou homogeneizar a cor e/ou branquear.*

Stopper *that* ***was submitted to*** ***chemical treatment*** *with the aim of disinfecting and/or homogenising the colour and / or bleaching.*

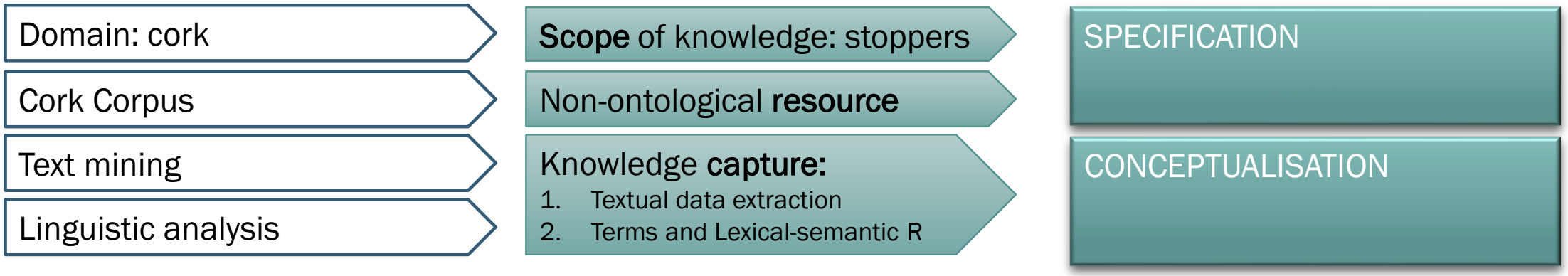
→ Linguistic expressions that commonly relate terms and denote domain knowledge:

LEXICAL MARKERS

4 DEFINITIONS SELECTED TO DEMONSTRATE OUR METHODOLOGY

4 definitions (literal translations from pt)	4 definitions (pt) extracted from the Cork corpus
stopper Product obtained from natural cork and / or agglomerated cork, consisting of one or more pieces, intended to seal bottles or other containers and to preserve their contents. (5.1 - NORM)	rolha Produto **obtido da** cortiça natural e / ou de cortiça aglomerada, **constituído por** uma ou mais peças, **destinado a** vedar garrafas ou outros recipientes e a preservar o seu conteúdo. (5.1 - NORM)
STOPPER piece of cork, usually cylindrical, conical or prismatic quadrangular, sometimes with rounded or chamfered lateral edges, consisting of one or several glued elements and intended to seal the containers or contribute to their water tightness. (7.8 – TECH)	ROLHA peça de cortiça, em geral cilíndrica, troncocónica ou prismática quadrangular, por vezes de arestas laterais boleadas ou chanfradas, **constituída por** um ou vários elementos colados e **destinada a** vedar os recipientes ou a contribuir para a sua *estanquicidade (7.8 – TECH)
natural cork stopper Stopper consisting entirely of natural cork Note: Natural cork stoppers that have been submitted to the sealing operation (see 6.5.5) are commonly referred to as colmated natural stoppers. (5.5 – NORM)	rolha de cortiça natural Rolha **totalmente constituída por** cortiça natural. Nota: As rolhas naturais que **tenham sido submetidas à** operação de colmatagem (ver 6.5.5) **são comummente designadas por** rolhas naturais colmatadas. (5.5 – NORM)
colmated natural cork stopper The colmated natural cork stopper is a stopper made of natural cork in which its lenticels are filled with a mixture of glues and cork powder from the dimensional finishing processes of natural cork stoppers. (6.1 – REP)	rolha de cortiça natural colmatada A rolha de cortiça natural colmatada é uma rolha **feita de** cortiça natural em que **são obturadas as suas lenticelas** com uma mistura de colas e pó de cortiça proveniente dos acabamentos dimensionais das rolhas de cortiça natural. (6.1 – REP)

LINGUISTIC ANALYSIS: THE 2ND TASK OF KNOWLEDGE CAPTURE



LINGUISTIC ANALYSIS: THE 1ST MOMENT OF KNOWLEDGE CAPTURE FROM SPECIALISED TEXTS

Language is the vehicle of the thought, mirroring the conceptualisation, where cognitive operations are performed

A conceptual systematisation underlies **term** systematisation

is the verbal designation of the concept

1. Linguistic analysis of textual definitions
   - Identify linguistic expressions relating terms
   - Infer lexical-semantic relations linguistically expressed by what we call lexical markers
   - Organise the interpretation of texts in the form of lexical maps

LINGUISTIC ANALYSIS : LEXICAL-SEMANTIC RELATIONS SYSTEMATISED AFTER THE DECONSTRUCTION OF THE DEFINITIONAL SENTENCE

Analysis Definition 3	Lexical marker observed	Lexical-semantic relation	Interpretation
natural cork stopper [is a] stopper	'is a' = Ø	HYPERNYMY - HYPONYMY	stopper [GENERIC] natural cork stopper [SPECIFIC]
natural cork stopper [consists entirely of] natural cork	'consisting entirely of'	HOLONYMY-MERONYMY	natural cork stopper [OBJECT] natural cork [STUFF]
natural cork stopper [is submitted to] the sealing operation	'submitted to'	HOLONYMY-MERONYMY	
colmated natural stopper [is a] natural cork stopper	'commonly referred to as' same as = 'is a'	HYPERNYMY - HYPO	
colmated natural stopper [results from] the sealing operation	results from = inferred from 'submitted to'	HOLONYMY-MERON	

interpretation

The meaning of "natural cork" points to the meaning of raw material, while the meaning of "stopper" points to the meaning of an object.

→ HOLONYMY-MERONYMY subtype: [OBJECT-STUFF]

LINGUISTIC ANALYSIS : CO-TEXT AND CONTEXT ARE CRUCIAL TO INTERPRET LM AND IDENTIFY SUB-TYPES OF MERONYMY

Lexical marker (pt)	Lexical marker (en)	Lexical-semantic relations	Sub-type of relation
'constituída por'	*'consisting of'*	HOLONYMY-MERONYMY	object-components

term A in context =object

"piece of cork" ..... consisting of "one or several glued elements"

meaning =components

Lexical marker (pt)	Lexical marker (en)	Lexical-semantic relations	Sub-type of relation
'totalmente constituída por'	*'consisting entirely of'*	HOLONYMY-MERONYMY	object-stuff

term A in co-text =object

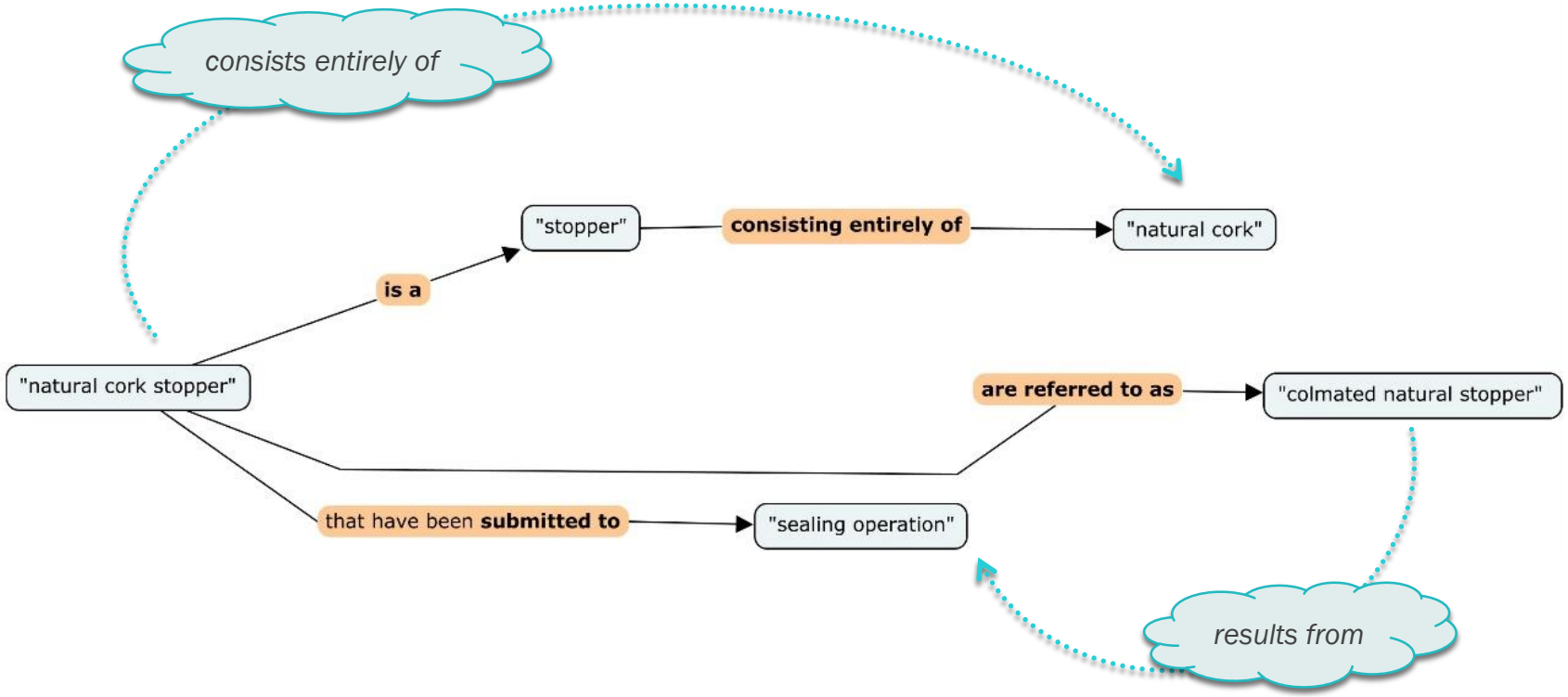
"stopper" consisting entirely of "natural cork"

term B in co-text =stuff

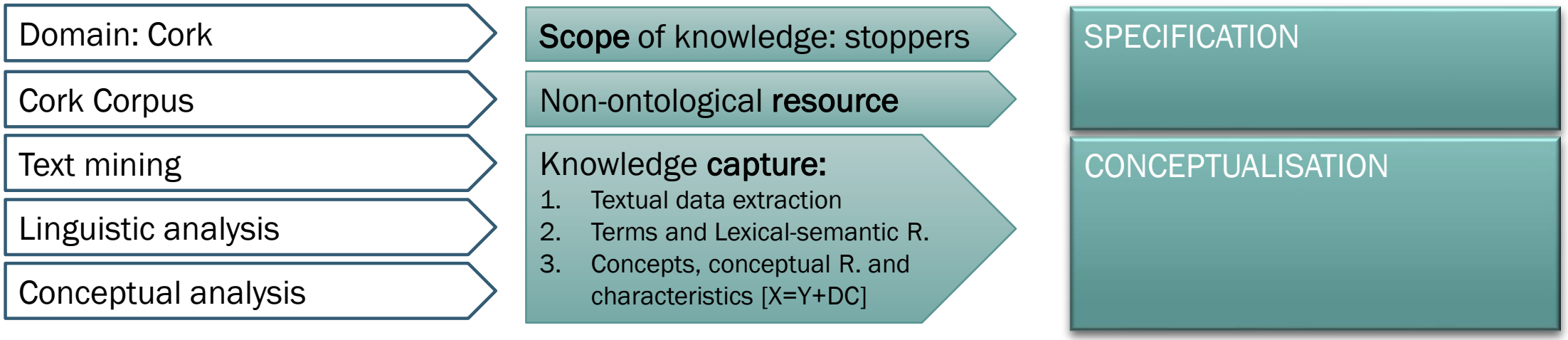
Lexical Map 3 - Representation of Definition 3 :

natural Cork Stopper

stopper consisting entirely of natural cork
Note: Natural cork stoppers that have been submitted to the sealing operation are commonly referred to as colmated natural stoppers



CONCEPTUAL ANALYSIS: THE 3RD TASK OF KNOWLEDGE CAPTURE



CONCEPTUAL ANALYSIS: X=Y+DC , A MECHANISM TO INFER KNOWLEDGE FROM TEXTS

Aristotelian formula X [SPECIES] = Y [GENUS] + DC [DIFFERENTIAL CHARACTERISTICS]

1.

We can systematically infer:

- **Characteristics**

  colmated natural stopper [SPECIES] = natural stopper [GENUS]+ colmated [DC]

- **concept's place**
  - *proximum* genus
  - species

  colmated natural cork stopper [SPECIES] = natural cork stopper [GENUS] + sealing operation [DC]

2.

Propose conceptual relations identifiers to mirror how concepts relate

- **Conceptual relations**
  - Subsumption
  - Associative
  - Partitive

has_process [corresponds to LM 'submitted to']

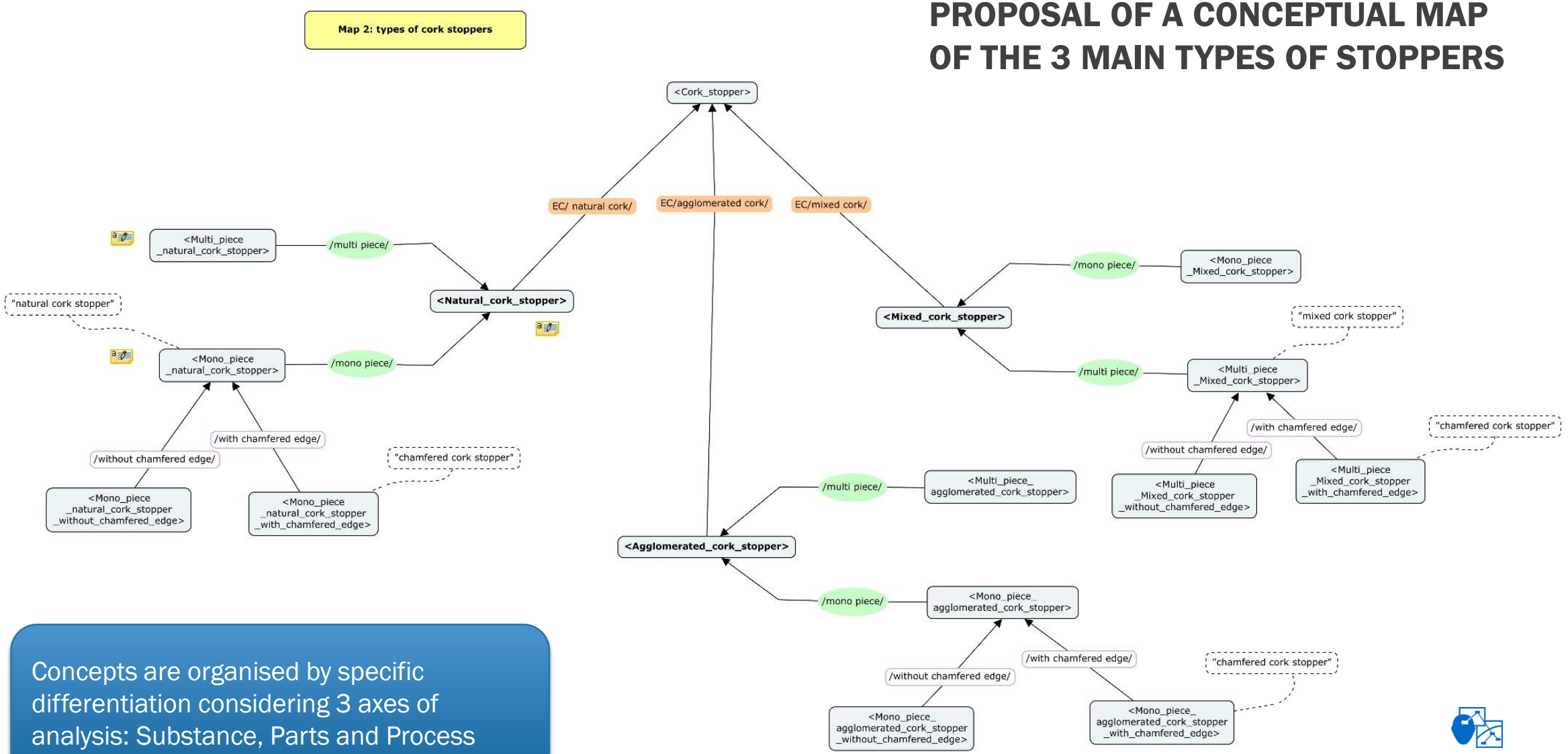
ASSOCIATIVE relation [PROCESS-RESULT]

The starting point to name concepts and domain descriptive relations to build the ontology

CONCEPTUAL ANALYSIS: FINDING AXES OF ANALYSIS TO BUILD AN ONTOLOGY

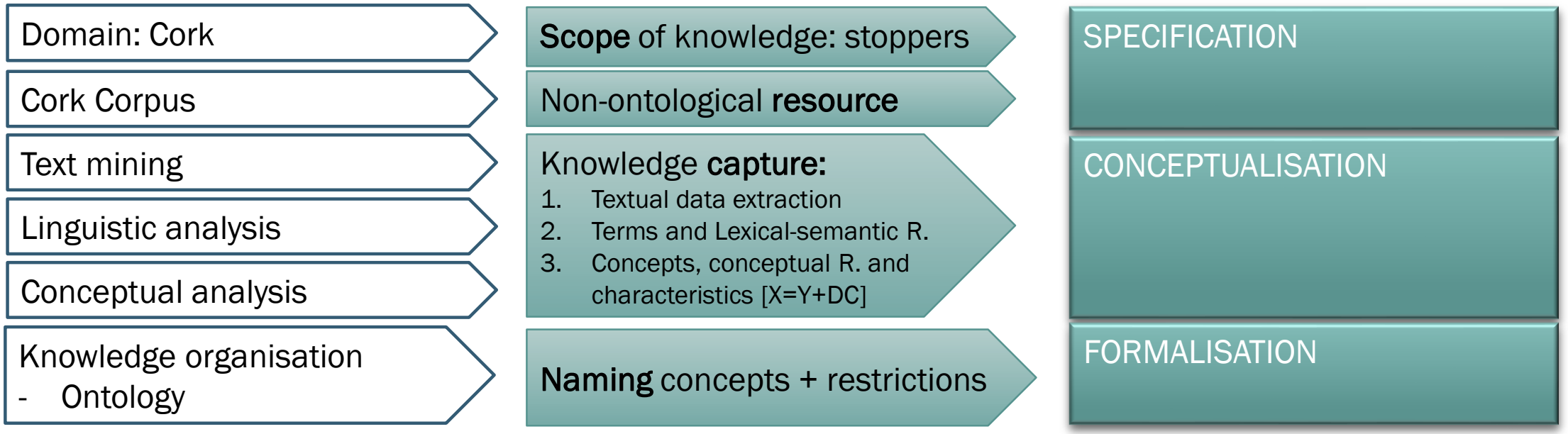
Lexical marker (en)	Lexical-semantic relation	Conceptual relation identifier	Conceptual relation	Axis of analysis
'usually'	HYPERNYMY - HYPONYMY	has_shape	ASSOCIATIVE **object-shape**	Shape
'sometimes with'	HYPERNYMY - HYPONYMY	has_process	ASSOCIATIVE **process-result**	Finishing Process
'commonly referred to as'	HYPERNYMY - HYPONYMY	is_a	SUBSUMPTION	
'consisting of'	HOLONYMY-MERONYMY **object-components**	has_part	PARTITIVE	Parts
'obtained from'	HOLONYMY-MERONYMY **object-stuff**	has_raw_material	ASSOCIATIVE **product-raw material**	Substance
'consisting entirely of'	HOLONYMY-MERONYMY **object-stuff**	has_substance	ASSOCIATIVE **matter/substance - property**	Substance
'have been submitted to'	HOLONYMY-MERONYMY **activity-feature**	has_process	ASSOCIATIVE **process-result**	Finishing Process
'is made of'	HOLONYMY-MERONYMY **object-stuff**	has_substance	ASSOCIATIVE **product-raw material**	Substance
'are filled with'	HOLONYMY-MERONYMY **activity-feature**	has_process	ASSOCIATIVE **process-result**	Finishing Process
'from the'	HOLONYMY-MERONYMY **activity-feature**	has_process	ASSOCIATIVE **process-result**	Finishing Process
'intended to'	---	has_function	ASSOCIATIVE **object-function**	Function

PROPOSAL OF A CONCEPTUAL MAP OF THE 3 MAIN TYPES OF STOPPERS



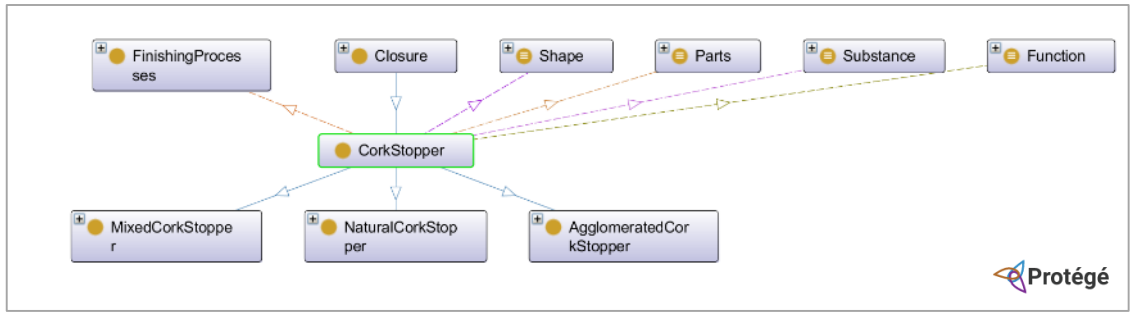
Concepts are organised by specific differentiation considering 3 axes of analysis: Substance, Parts and Process

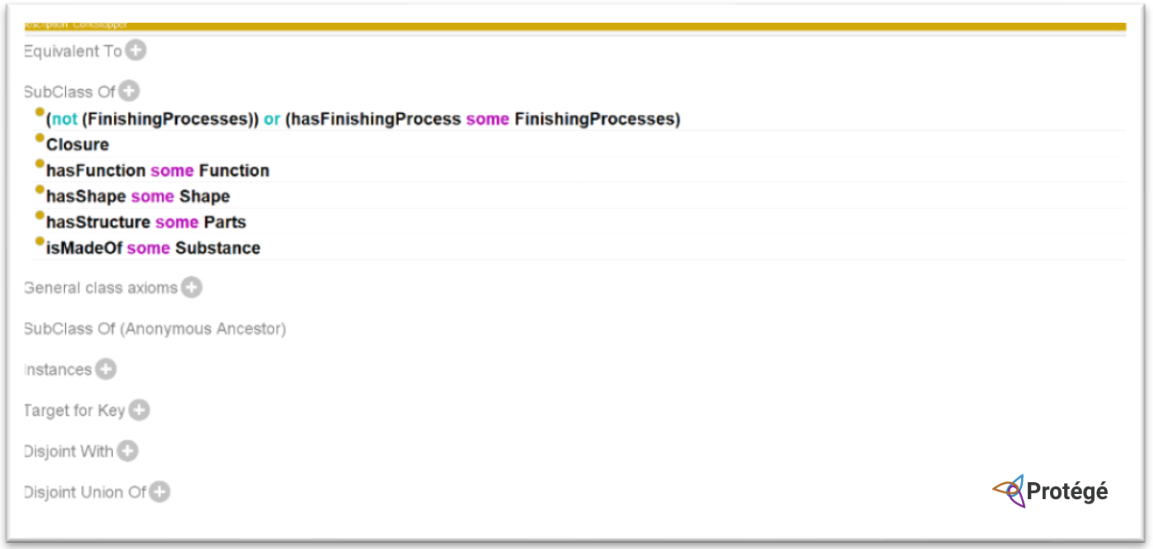
KNOWLEDGE ORGANISATION: NAMING CONCEPTS AND RESTRICTIONS TO BUILD THE ONTOLOGY



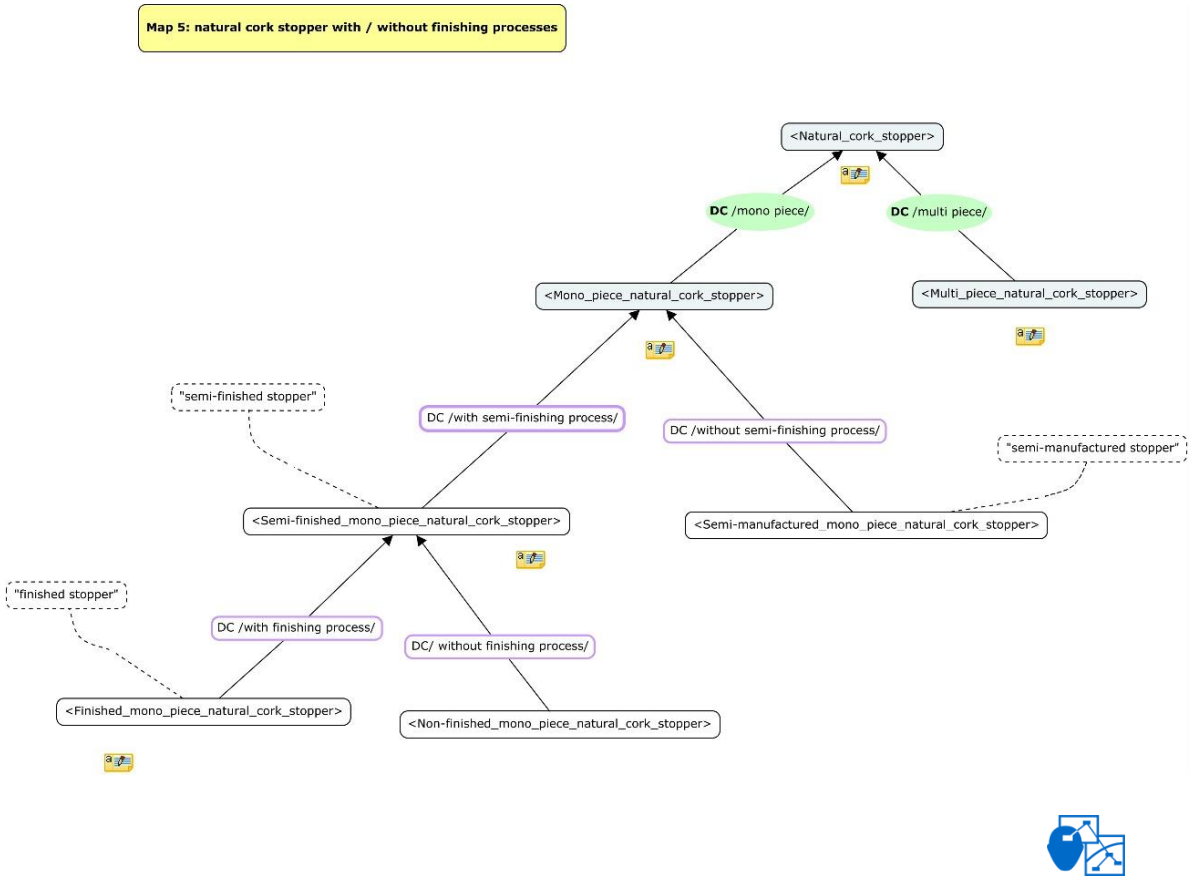
KNOWLEDGE ORGANISATION: NAMING RESTRICTIONS BASED ON THE 5 AXES OF ANALYSIS

Conceptual relation identifiers	Domain description relations = 5 axes of analysis
has_shape	hasShape
has_process	hasFinishingProcess
has_part	hasStructure
has_raw_material	IsMadeOf
has_substance	
has_function	hasFunction



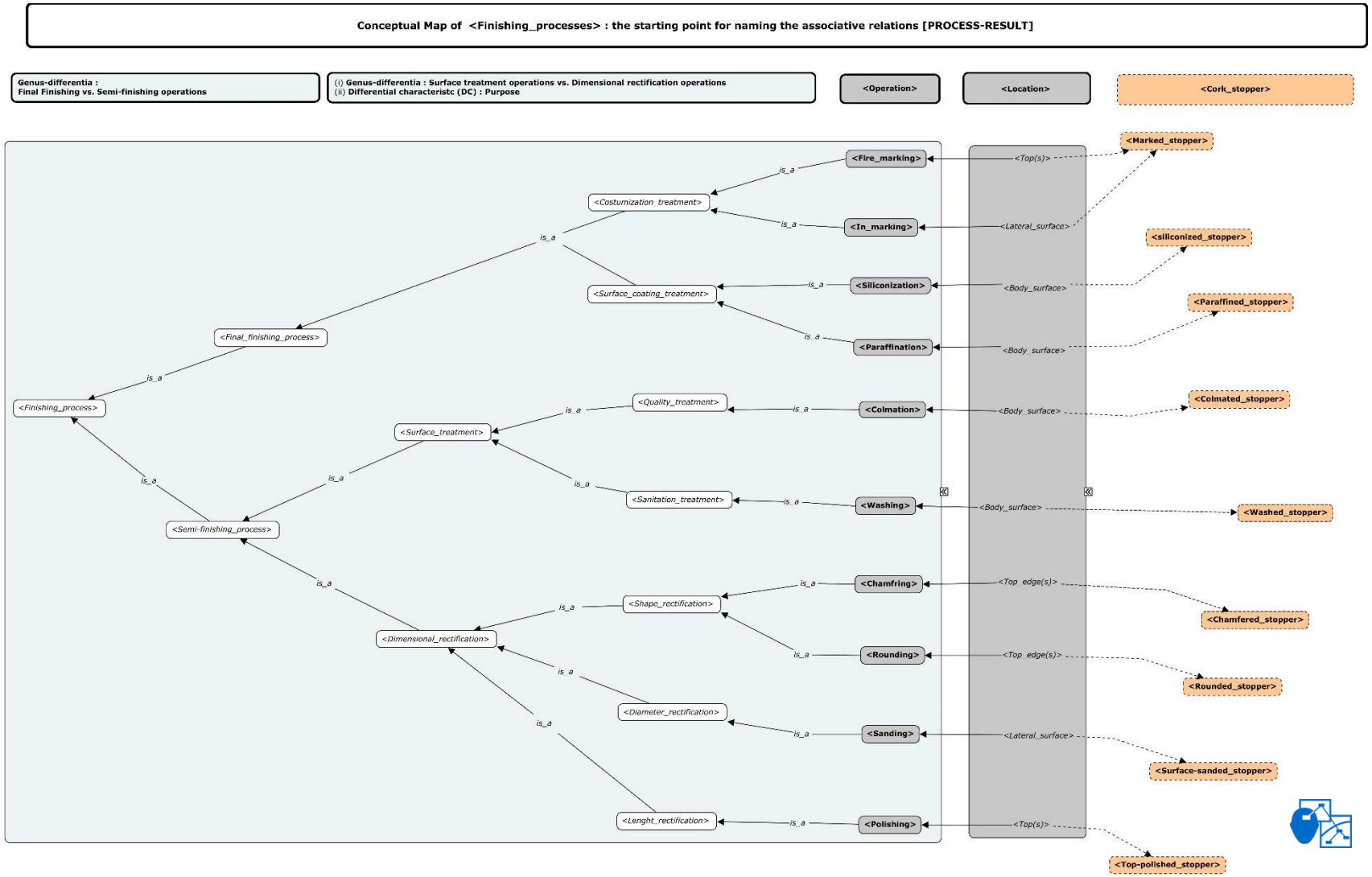


KNOWLEDGE ORGANISATION: NAMING CONCEPTS ACCORDING TO THE (I) WHOLE SET OF CHARACTERISTICS OR (II) THE STAGE IN THE MANUFACTURE PROCESS

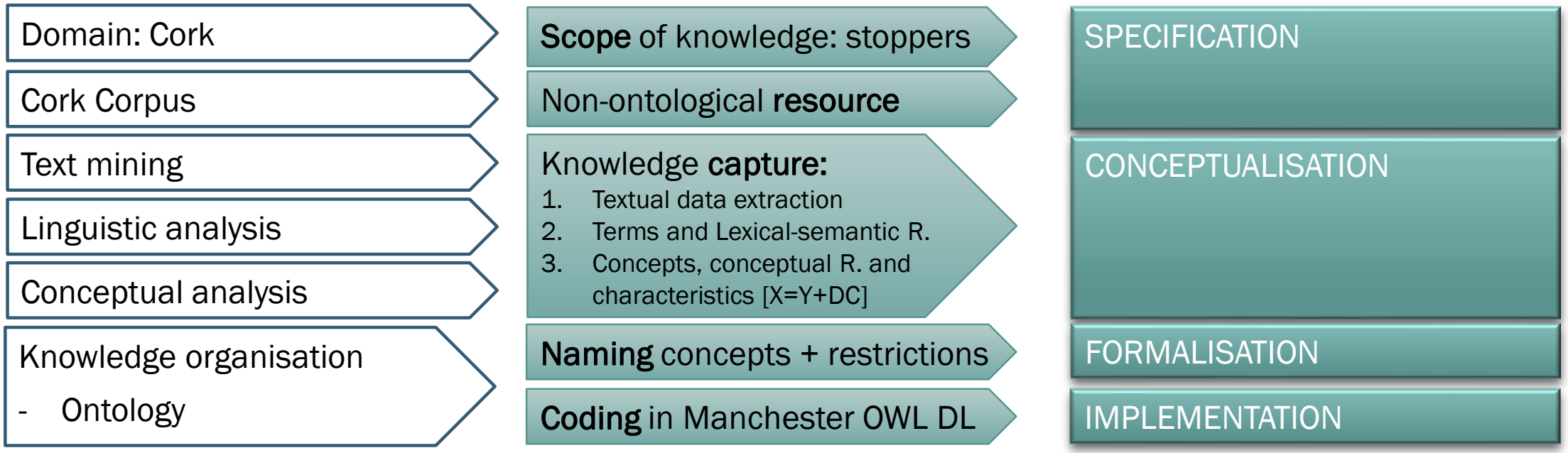


KNOWLEDGE ORGANISATION: NAMING CONCEPTS ACCORDING TO THEIR PURPOSE

- FinishingProcesses
  - FinalFinishingProcesses
    - CostumizationTreatment
      - FireMarkinOperation
      - InkMarkingOperation
    - SurfaceCoatingTreatment
      - SurfaceParaffination
      - SurfaceSiliconization
  - Semi-finishingProcesses
    - DimensionalRectification
      - DiameterRectification
        - SurfaceSandingOperation
      - LengthRectification
        - TopPolishingOperation
      - ShapeRectification
        - EdgeChamferingOperation
        - EdgeRoundingOperation
    - SurfaceTreatment
      - QualityTreatment
        - LenticelsColmation
      - SanitationTreatment
        - SurfaceWashing



KNOWLEDGE ORGANISATION CODING IN MANCHESTER OWL DL



KNOWLEDGE ORGANISATION: THE METRICS OF THE ONTOLOGY

Ontology metrics:

Metrics	
Axiom	791
Logical axiom count	275
Declaration axioms count	152
Class count	54
Object property count	40
Data property count	9
Individual count	24
Annotation Property count	29
Class axioms	
SubClassOf	53
EquivalentClasses	15
DisjointClasses	17
GCI count	0
Hidden GCI Count	0
Object property axioms	
SubObjectPropertyOf	36
EquivalentObjectProperties	0
InverseObjectProperties	0
DisjointObjectProperties	0
FunctionalObjectProperty	0
InverseFunctionalObjectProperty	0
TransitiveObjectProperty	8
SymmetricObjectProperty	0
AsymmetricObjectProperty	0
ReflexiveObjectProperty	0
IrrefexiveObjectProperty	0
ObjectPropertyDomain	36
ObjectPropertyRange	34
SubPropertyChainOf	0
Data property axioms	
SubDataPropertyOf	3
EquivalentDataProperties	0
DisjointDataProperties	0
FunctionalDataProperty	0
DataPropertyDomain	15
DataPropertyRange	4

OntoCork is a micro domain-ontology of cork stoppers according to their structure, substance, function, shape and finishing treatments, within the scope of the transformation sector in the industry of cork.

This ontology seeks to respond to two typologies:
(1) the type of cork stopper compared to the type of cork (raw material) with which it is produced; and
(2) the typology of operations that belong to the finishing processes.

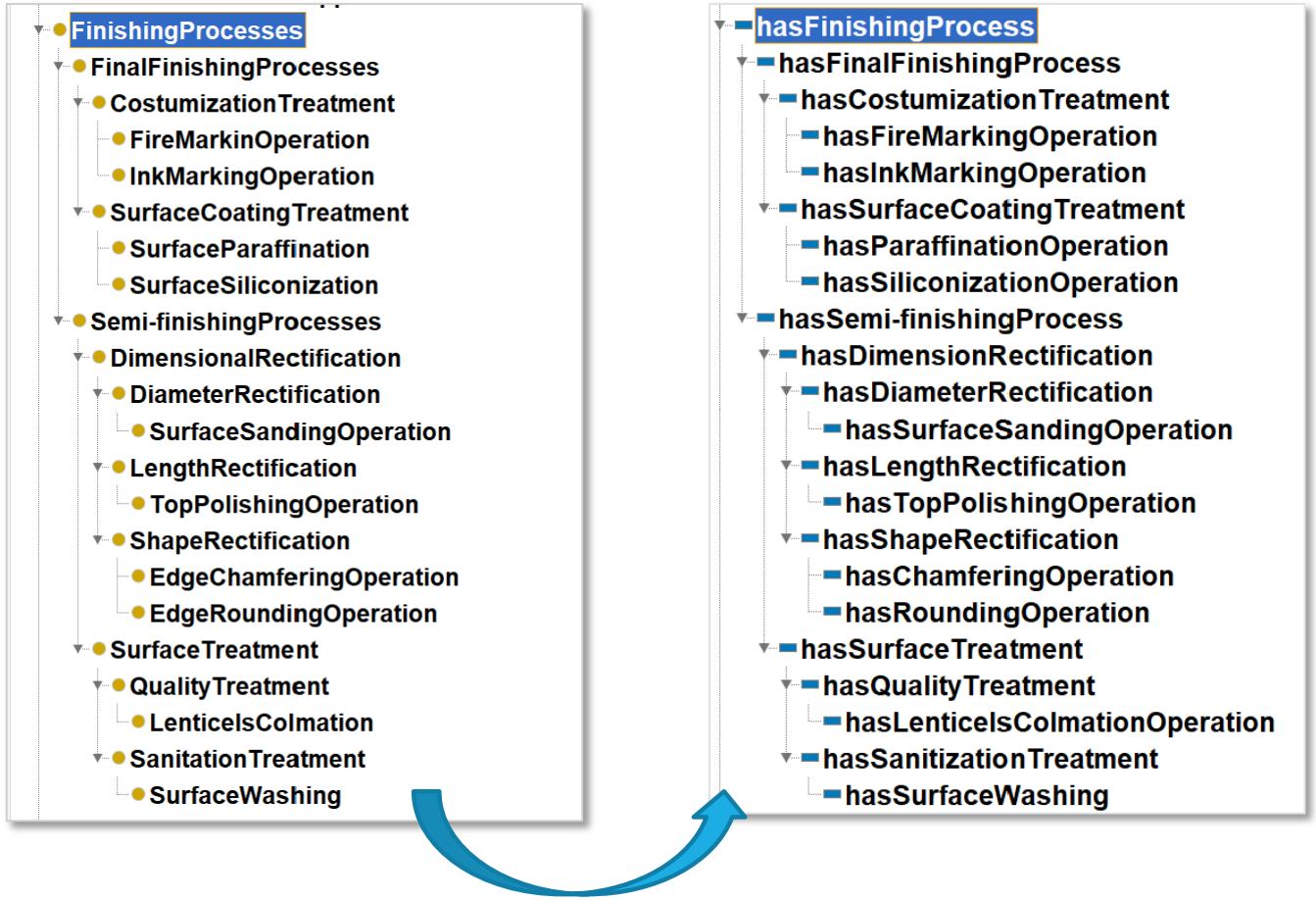
Finally, this ontology should also respond to the state of completion – in the sense of finished product – of the cork stopper, depending on the last operation to which it was submitted.

Individual axioms	
ClassAssertion	0
ObjectPropertyAssertion	44
DataPropertyAssertion	9
NegativeObjectPropertyAssertion	0
NegativeDataPropertyAssertion	0
SameIndividual	0
DifferentIndividuals	1
Annotation axioms	
AnnotationAssertion	362
AnnotationPropertyDomain	0
AnnotationPropertyRangeOf	0

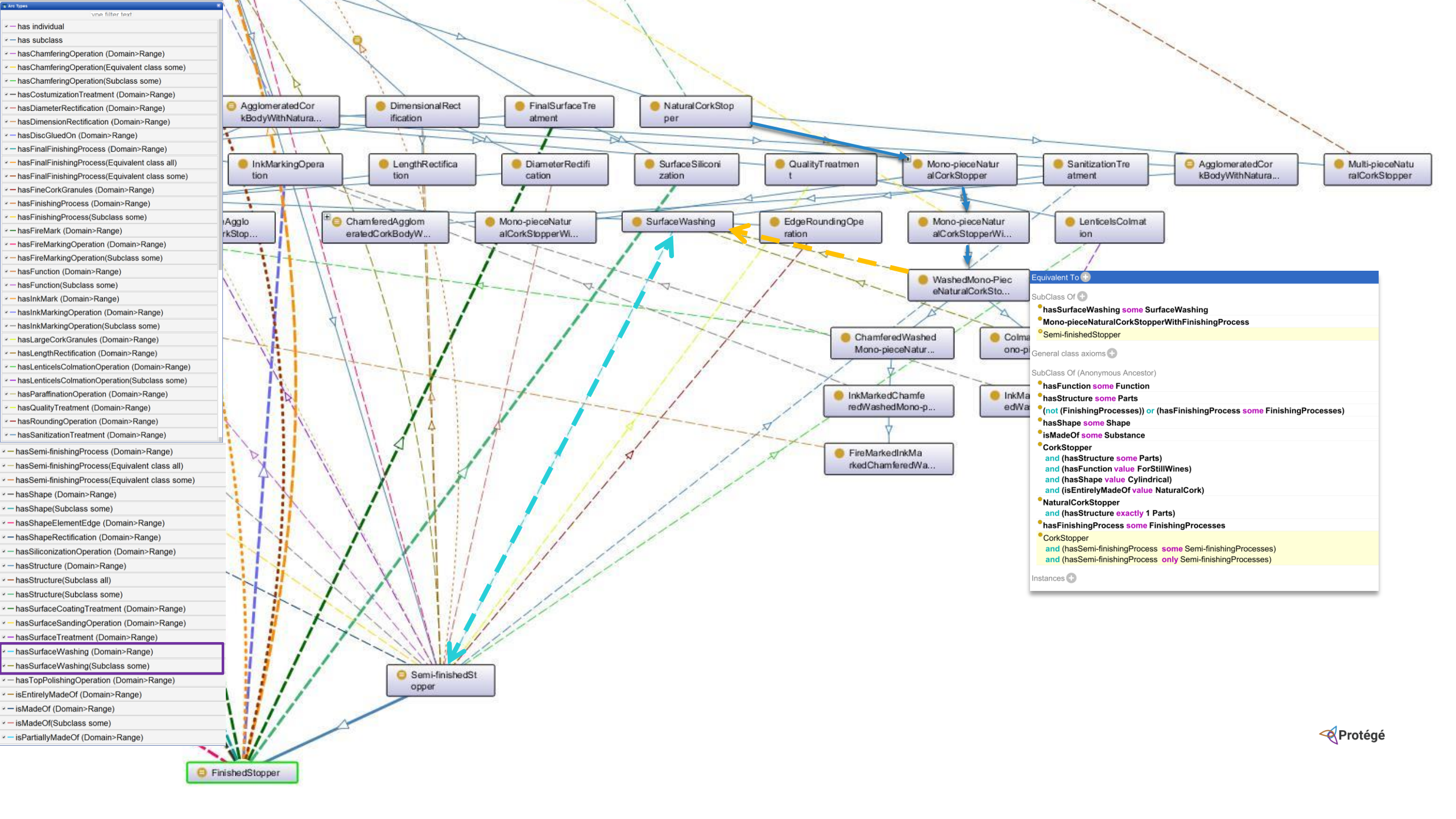
Protégé

KNOWLEDGE ORGANISATION: CODING IN MANCHESTER OWL

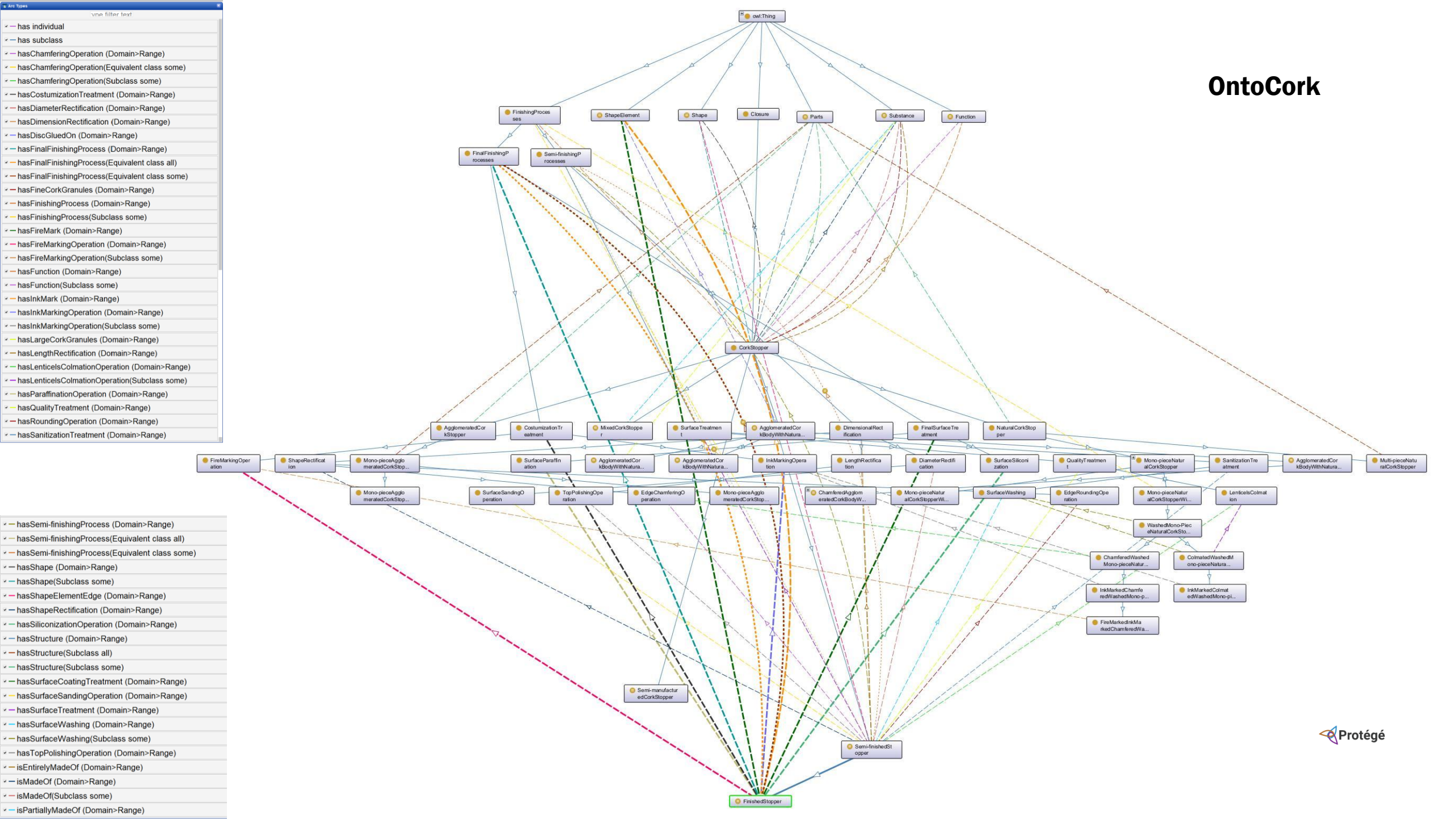
hasFinishingProcesses
is a restriction used to express the conceptual relation [PROCESS-RESULT]



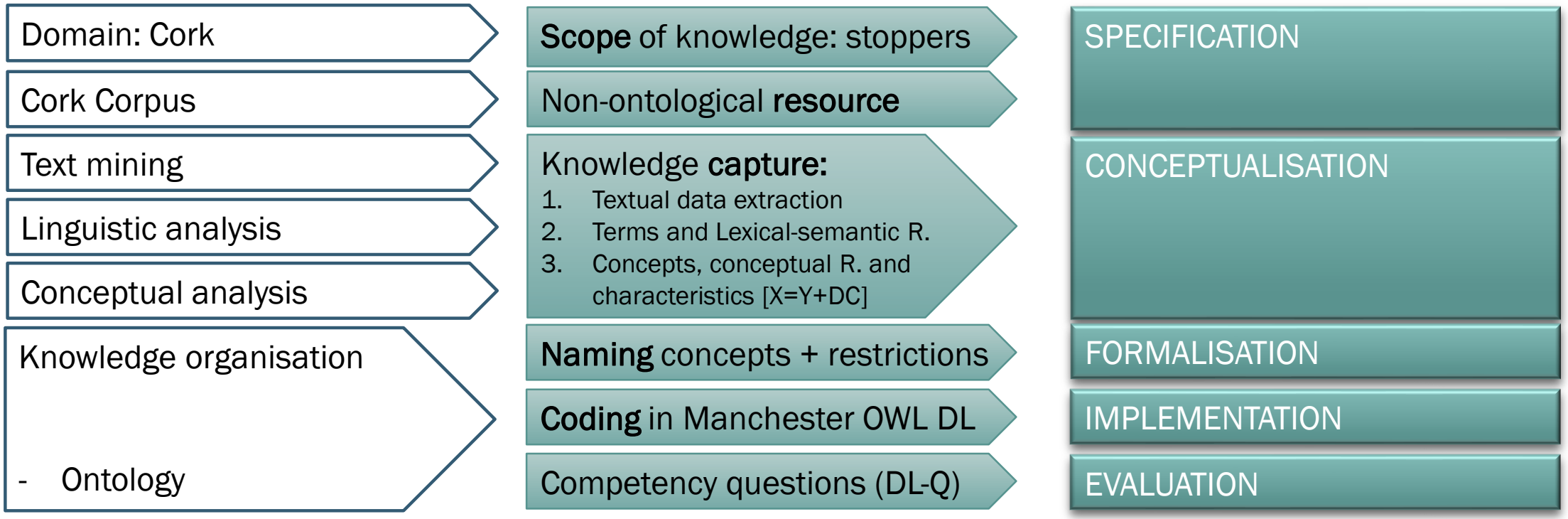
owl:domain and owl:range restrictions dictate the classification of concepts in the manufacturing process


Arc Types
type filter text
has individual
has subclass
hasChamferingOperation (Domain>Range)
hasChamferingOperation(Equivalent class some)
hasChamferingOperation(Subclass some)
hasCostumizationTreatment (Domain>Range)
hasDiameterRectification (Domain>Range)
hasDimensionRectification (Domain>Range)
hasDiscGluedOn (Domain>Range)
hasFinalFinishingProcess (Domain>Range)
hasFinalFinishingProcess(Equivalent class all)
hasFinalFinishingProcess(Equivalent class some)
hasFineCorkGranules (Domain>Range)
hasFinishingProcess (Domain>Range)
hasFinishingProcess(Subclass some)
hasFireMark (Domain>Range)
hasFireMarkingOperation (Domain>Range)
hasFireMarkingOperation(Subclass some)
hasFunction (Domain>Range)
hasFunction(Subclass some)
hasInkMark (Domain>Range)
hasInkMarkingOperation (Domain>Range)
hasInkMarkingOperation(Subclass some)
hasLargeCorkGranules (Domain>Range)
hasLengthRectification (Domain>Range)
hasLenticelsColmationOperation (Domain>Range)
hasLenticelsColmationOperation(Subclass some)
hasParaffinationOperation (Domain>Range)
hasQualityTreatment (Domain>Range)
hasRoundingOperation (Domain>Range)
hasSanitizationTreatment (Domain>Range)
hasSemi-finishingProcess (Domain>Range)
hasSemi-finishingProcess(Equivalent class all)
hasSemi-finishingProcess(Equivalent class some)
hasShape (Domain>Range)
hasShape(Subclass some)
hasShapeElementEdge (Domain>Range)
hasShapeRectification (Domain>Range)
hasSiliconizationOperation (Domain>Range)
hasStructure (Domain>Range)
hasStructure(Subclass all)
hasStructure(Subclass some)
hasSurfaceCoatingTreatment (Domain>Range)
hasSurfaceSandingOperation (Domain>Range)
hasSurfaceTreatment (Domain>Range)
hasSurfaceWashing (Domain>Range)
hasSurfaceWashing(Subclass some)
hasTopPolishingOperation (Domain>Range)
isEntirelyMadeOf (Domain>Range)
isMadeOf (Domain>Range)
isMadeOf(Subclass some)
isPartiallyMadeOf (Domain>Range)
AgglomeratedCorkBodyWithNatura...
DimensionalRectification
FinalSurfaceTreatment
NaturalCorkStopper
InkMarkingOperation
LengthRectification
DiameterRectification
SurfaceSiliconization
QualityTreatment
Mono-pieceNaturalCorkStopper
SanitizationTreatment
AgglomeratedCorkBodyWithNatura...
Multi-pieceNaturalCorkStopper
ChamferedAgglomeratedCorkBodyW...
Mono-pieceNaturalCorkStopperWi...
SurfaceWashing
EdgeRoundingOperation
Mono-pieceNaturalCorkStopperWi...
LenticelsColmation
WashedMono-PieceNaturalCorkSto...
ChamferedWashedMono-pieceNatur...
InkMarkedChamferedWashedMono-p...
FireMarkedInkMarkedChamferedWa...
Semi-finishedStopper
FinishedStopper
Equivalent To
SubClass Of
hasSurfaceWashing some SurfaceWashing
Mono-pieceNaturalCorkStopperWithFinishingProcess
Semi-finishedStopper
General class axioms
SubClass Of (Anonymous Ancestor)
hasFunction some Function
hasStructure some Parts
(not (FinishingProcesses)) or (hasFinishingProcess some FinishingProcesses)
hasShape some Shape
isMadeOf some Substance
CorkStopper
and (hasStructure some Parts)
and (hasFunction value ForStillWines)
and (hasShape value Cylindrical)
and (isEntirelyMadeOf value NaturalCork)
NaturalCorkStopper
and (hasStructure exactly 1 Parts)
hasFinishingProcess some FinishingProcesses
CorkStopper
and (hasSemi-finishingProcess some Semi-finishingProcesses)
and (hasSemi-finishingProcess only Semi-finishingProcesses)
Instances
Protégé

OntoCork


Arc Types
has individual
has subclass
hasChamferingOperation (Domain>Range)
hasChamferingOperation(Equivalent class some)
hasChamferingOperation(Subclass some)
hasCostumizationTreatment (Domain>Range)
hasDiameterRectification (Domain>Range)
hasDimensionRectification (Domain>Range)
hasDiscGluedOn (Domain>Range)
hasFinalFinishingProcess (Domain>Range)
hasFinalFinishingProcess(Equivalent class all)
hasFinalFinishingProcess(Equivalent class some)
hasFineCorkGranules (Domain>Range)
hasFinishingProcess (Domain>Range)
hasFinishingProcess(Subclass some)
hasFireMark (Domain>Range)
hasFireMarkingOperation (Domain>Range)
hasFireMarkingOperation(Subclass some)
hasFunction (Domain>Range)
hasFunction(Subclass some)
hasInkMark (Domain>Range)
hasInkMarkingOperation (Domain>Range)
hasInkMarkingOperation(Subclass some)
hasLargeCorkGranules (Domain>Range)
hasLengthRectification (Domain>Range)
hasLenticelsColmationOperation (Domain>Range)
hasLenticelsColmationOperation(Subclass some)
hasParaffinationOperation (Domain>Range)
hasQualityTreatment (Domain>Range)
hasRoundingOperation (Domain>Range)
hasSanitizationTreatment (Domain>Range)
hasSemi-finishingProcess (Domain>Range)
hasSemi-finishingProcess(Equivalent class all)
hasSemi-finishingProcess(Equivalent class some)
hasShape (Domain>Range)
hasShape(Subclass some)
hasShapeElementEdge (Domain>Range)
hasShapeRectification (Domain>Range)
hasSiliconizationOperation (Domain>Range)
hasStructure (Domain>Range)
hasStructure(Subclass all)
hasStructure(Subclass some)
hasSurfaceCoatingTreatment (Domain>Range)
hasSurfaceSandingOperation (Domain>Range)
hasSurfaceTreatment (Domain>Range)
hasSurfaceWashing (Domain>Range)
hasSurfaceWashing(Subclass some)
hasTopPolishingOperation (Domain>Range)
isEntirelyMadeOf (Domain>Range)
isMadeOf (Domain>Range)
isMadeOf(Subclass some)
isPartiallyMadeOf (Domain>Range)
owl:Thing
FinishingProcesses
ShapeElement
Shape
Closure
Parts
Substance
Function
FinalFinishingProcesses
Semi-finishingProcesses
CorkStopper
AgglomeratedCorkStopper
CostumizationTreatment
MixedCorkStopper
SurfaceTreatment
AgglomeratedCorkBodyWithNatura...
DimensionalRectification
FinalSurfaceTreatment
NaturalCorkStopper
FireMarkingOperation
ShapeRectification
Mono-pieceAgglomeratedCorkStop...
SurfaceParaffination
AgglomeratedCorkBodyWithNatura...
InkMarkingOperation
LengthRectification
DiameterRectification
SiliconizationOperation
QualityTreatment
Mono-pieceNaturalCorkStopper
SanitizationTreatment
AgglomeratedCorkBodyWithNatura...
Multi-pieceNaturalCorkStopper
SurfaceSandingOperation
TopPolishingOperation
EdgeChamferingOperation
ChamferedAgglomeratedCorkBodyW...
Mono-pieceNaturalCorkStopperWi...
SurfaceWashing
EdgeRoundingOperation
LenticelsColmation
WashedMono-PieceNaturalCorkSto...
ChamferedWashedMono-pieceNatur...
ColmatedWashedMono-pieceNatura...
InkMarkedChamferedWashedMono-p...
InkMarkedColmatedWashedMono-pi...
FireMarkedInkMarkedChamferedWa...
Semi-manufacturedCorkStopper
Semi-finishedStopper
FinishedStopper
Protégé

KNOWLEDGE ORGANISATION: SOME COMPETENCY QUESTIONS



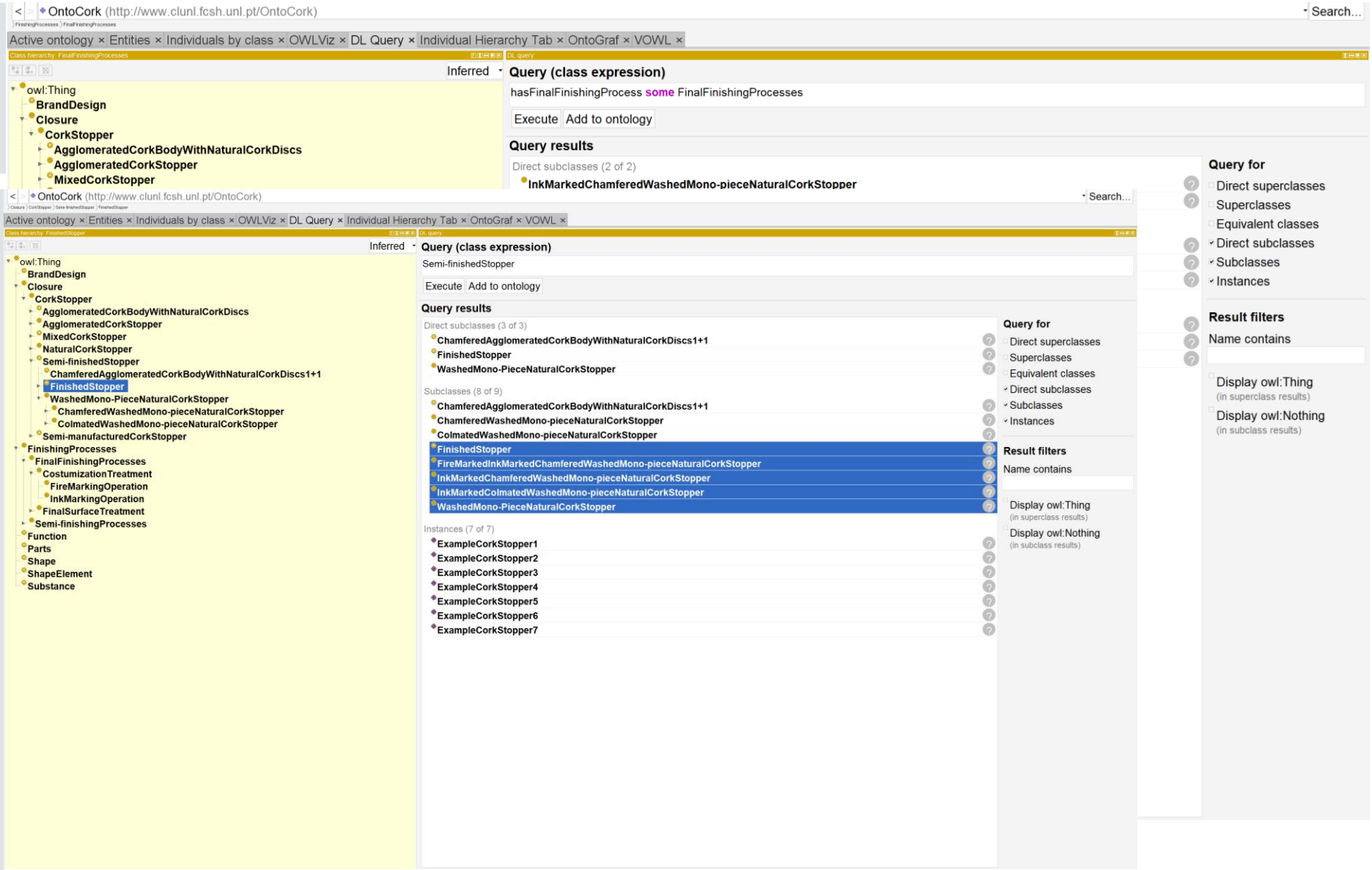
1. which stoppers have “final finishing processes”?
OK

2. what is a “semi-finished stopper”?

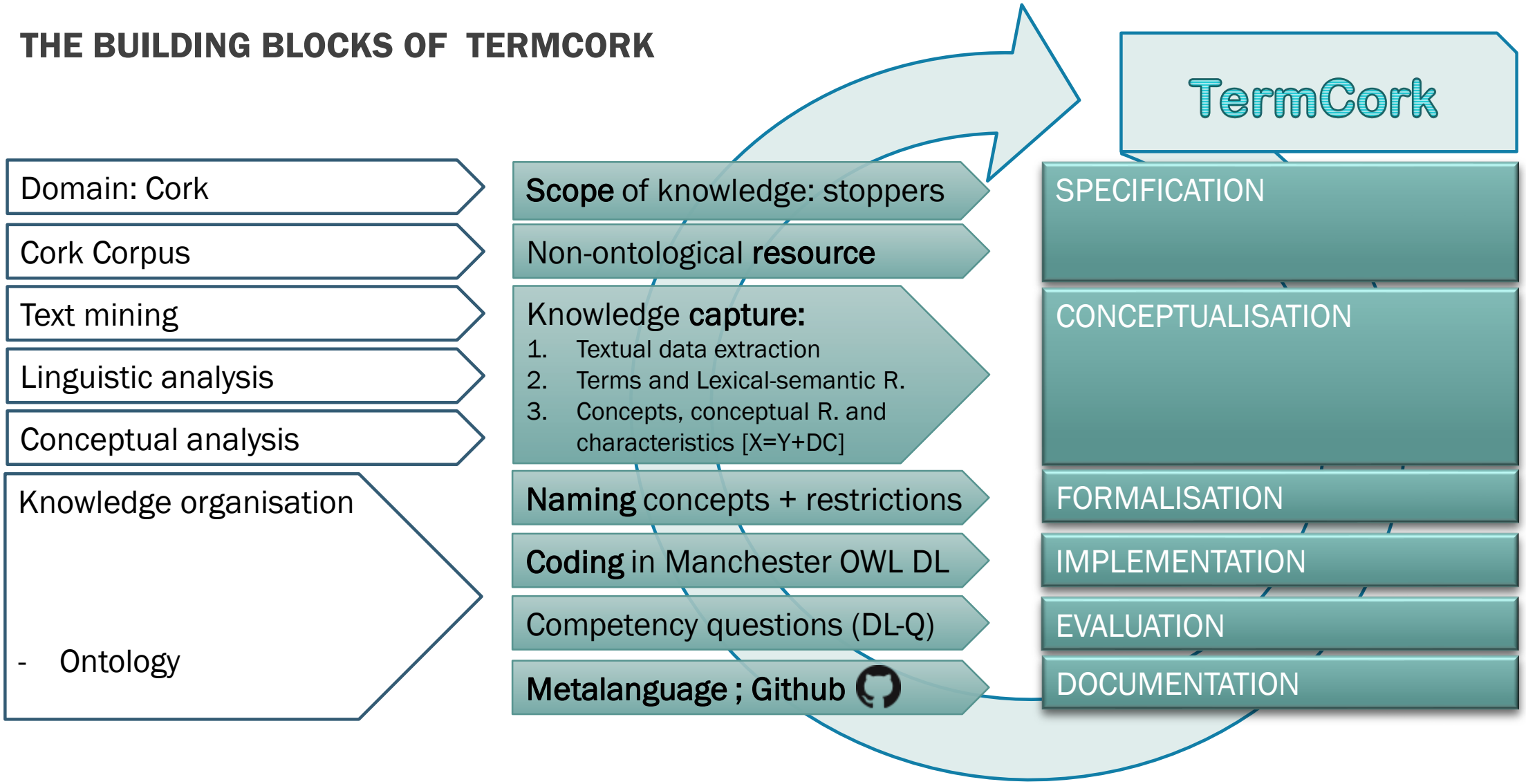
Almost OK:

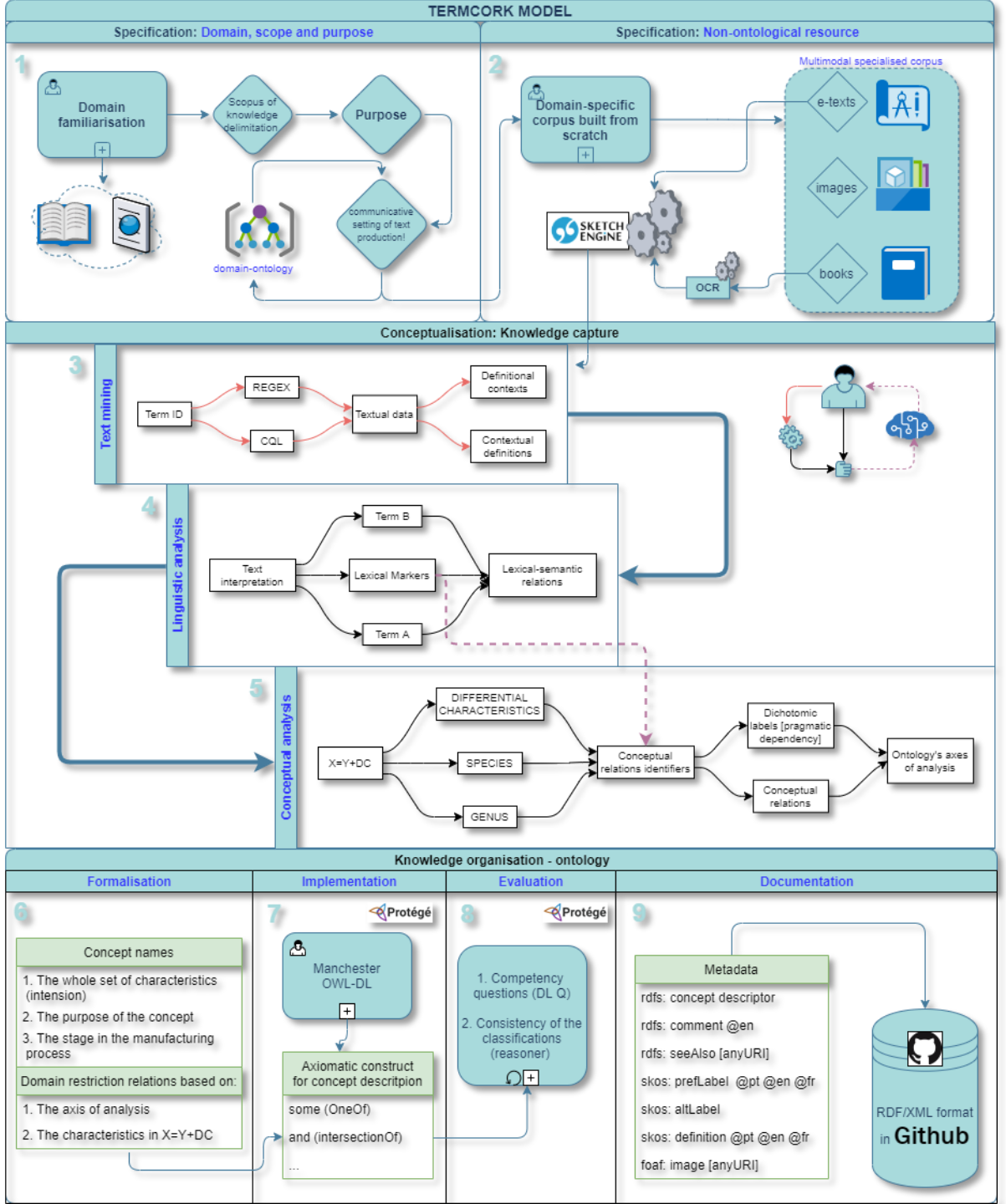
The answer includes FinishedStopper because it’s a species of the previous.

Yet again, it’s OK!
the goal of this decision is getting a switch of status as soon as the description includes a restriction with the domain set to <FinishedStopper> ☺



THE BUILDING BLOCKS OF TERMCORK





Model of the methodology following the classic cycle to build an ontology

FUTURE WORK: A PROJECT TO BUILD A LEXICOGRAPHIC RESOURCE PAIRED WITH AN ONTOLOGY

TermCork methodology will underpin the design of a project to build a multimodal (multimedium) terminological resource:

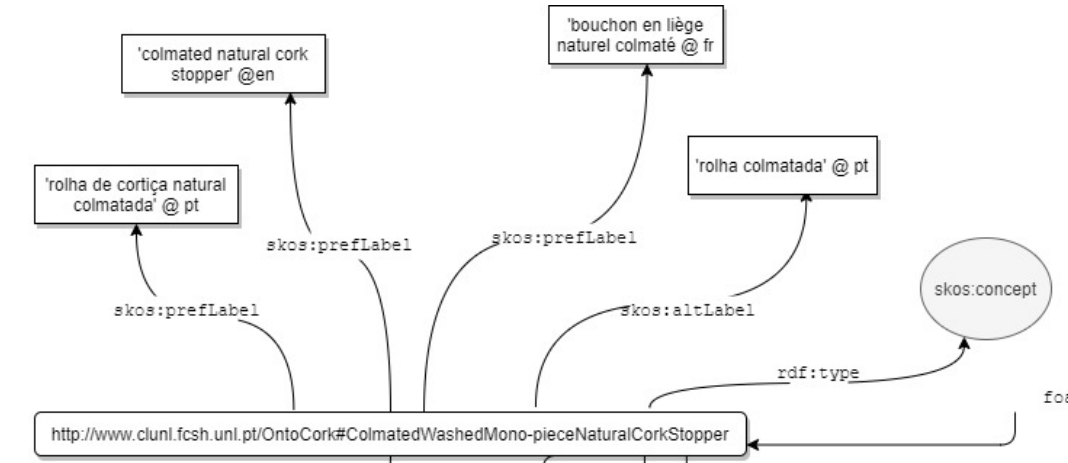
- Linking several resources with SKOS (1) Core Vocabulary– a W3C recommendation for interoperability in the Web Semantic, to express a concept scheme as an RDF graph:
  - CorkCorpus (specialised texts and images)
  - OntoCork
  - Lexonomy (e-Dictionary)

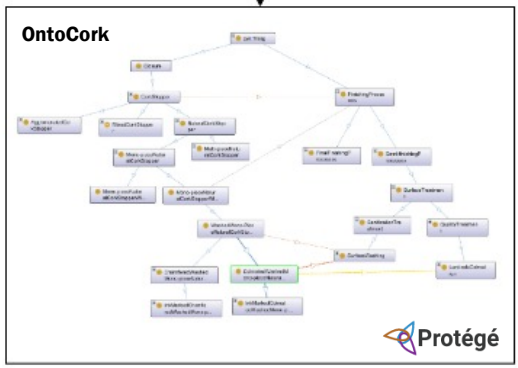
(1) Simple Knowledge Organisation System

FROM FORMAL OWL TO A LESS FORMAL MODEL: SKOS

For triples involving the rdf:type property, the RDF/XML syntax allows a shortened form to model multilingual SKOS labels and link resources to the concept

```
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:skos=http://www.w3.org/2004/02/skos/core#
  xmlns:foaf="http://xmlns.com/foaf/0.1/">

  <skos:Concept
rdf:about="http://www.clunl.fcsh.unl.pt/OntoCork#ColmatedWashedMono-
pieceNaturalCorkStopper">

  <skos:prefLabel xml:lang="pt">rolha de cortiça natural colmatada</skos:prefLabel>
  <skos:prefLabel xml:lang="en">colmated natural cork stopper</skos:prefLabel>
  <skos:prefLabel xml:lang="fr">bouchon en liège natuel colmaté</skos:prefLabel>
  <skos:altLabel xml:lang="pt">rolha colmatada</skos:altLabel>

  <skos:definition xml:lang="pt">rolha de cortiça natural submetida a operação de
colmatagem<skos:definition/>

  <foaf:depiction rdf:resource=https://www.apcor.pt/wp-
ontent/uploads/2015/09/colmatada.jpg/>

  <foaf:isPrimarySubject
rdf:resource=https://www.lexonomy.eu/k4ysn6um/edit/entry/>

  <foaf:isSubject rdf:resource=http://www.clunl.fcsh.unl.pt/OntoCork/>

 <foaf:SubjectOf rdf:resource="http:// www.clunl.fcsh.unl.pt/CorkCorpus"/>

  </skos:Concept>
</rdf:RDF>
```





SOME CONCLUSIONS

- Specialised texts are an undeniable source of rich knowledge contexts
  - Particularly definitional contexts;
  - The expert's choices in discourse tend to mirror how concepts relate with each other.
- Getting familiarised with the domain is essential for the capture and interpretation of specialised texts
  - Some texts do not convey the whole information that a non-expert needs to grasp the concept.
- The methodology CorkTerm is not designed for the domain of cork exclusively
  - Textual data is the starting point of knowledge access
  - Linguistic and conceptual analysis of textual data allows us to model information systematically
  - Dichotomic labels, e.g. [PROCESS-RESULT] can be integrated in future lexicographic work, e.g., encoding domain tags; semantic tags; …
- Special field knowledge resources can be shared through the interoperability exchange formats used for encoding information
  - SKOS Core Vocabulary and other RDF applications such as FOAF are encoding that facilitates machine-readability between resources
  - Documents indexation is another complementary resource that can be thought of to be included
- Knowledge modelling in the form of an ontology – a common and shared terminology – is an added-value for both experts and non-experts settings of communication
  - Intensional definitions of concepts in natural language and corresponding formal descriptions, along with their visualisation in the form of an OntGraf, are complementary resources for knowledge acquisition and/or dissemination.