



KNOWDIVE



KDI ● **Knowledge and Data Integration**

Modelling the ER

iTelos Informal Modeling Phase

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1 The ER Model

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Modelling ER - Methodology

The general methodology for modelling the purpose specific ER comprise the following (flexible) steps:

- 1 Specify the reference context, *viz. Thing*, in the context of our Purpose
- 2 Instantiate the *Object Partonomy* with respect to *Thing*
- 3 Relate each *object* to its (proper) *function(s)*
- 4 Relate each *function* to its (admissible) *action(s)*
- 5 Relate each *object* to its (admissible) *action(s)*

NOTE: Specify properties and attributes (including data types) for each individual concept in (2), (3), (4) and (5).

Modelling ER - Observations

Some general observations regarding the methodology for modelling of the ER are as follows:

- 1 *iTelos* is *completely flexible* in terms of the various combination of concepts (amongst objects, functions and actions) required for modelling a particular scenario w.r.t a reference context
- 2 The *flexibility* is achieved via the usage of customized *teleological patterns* for specific modelling requirements. Examples being *Object* hierarchies, *Object-Function* patterns, *Object-Action* patterns etc
- 3 For instance, in *geospatial domain*, we can *collapse* all the concepts in an *object hierarchy* (as functions and actions might be irrelevant to model)
- 4 Similarly, in *process modelling*, representing *actions* are of utmost importance

Modelling ER - Example

We take a small motivating example from the *the domain of facilities for food and accommodation in Trentino* to illustrate our methodology -

- **(Step 1:)** Specify the reference context, *viz. Thing*, in the context of our Purpose
- In the context of our example, the reference context, *viz. Thing*, is the region of Trentino from 1st Jan - 31st Dec 2020
- Spatio-Temporal Attributes of *Thing* are as follows -
 - Spatial Attributes - *Latitude, Longitude, Area, Volume*
 - Temporal Attributes - *startDate, endDate*

Modelling ER - Example (Contd.)

- **(Step 2:)** Instantiate the *Object Partonomy* with respect to *Thing*
- In the context of the (partial view of our) example, we decide to model the following *mutually disjoint objects* -
 - *Person*
 - *Establishment*
- *Object to Object relations* are also considered, like, for example, *Establishment hasResident Person*
- It is important to note that (each of) the concepts modelled in the *Object Partonomy* are *part of* the reference context *Thing*, for instance, Trentino [01.01.2020-31.12.2020] in the context of our example.

Modelling ER - Example (Contd.)

- **(Step 3:)** Relate each *object* to its (proper) *function(s)*
- In the context of the (partial view of our) example, we decide to model the following *functions* related to the *objects* considered -
 - *Person* has proper functions like *MS Student*, *PhD Student*, etc.
 - *Establishment* has proper functions like *Hostel*, *Bar*, *Motel*, etc.

Modelling ER - Example (Contd.)

- **(Step 4:)** Relate each *function* to its (admissible) *action(s)*
- In the context of the (partial view of our) example, we decide to model the following *actions* related to the *functions* considered -
 - *PhD Student* has proper actions like *attendCourse*, *writeResearchPaper*, etc.
 - *Hostel* has proper actions like *catering*, *consierge* etc.

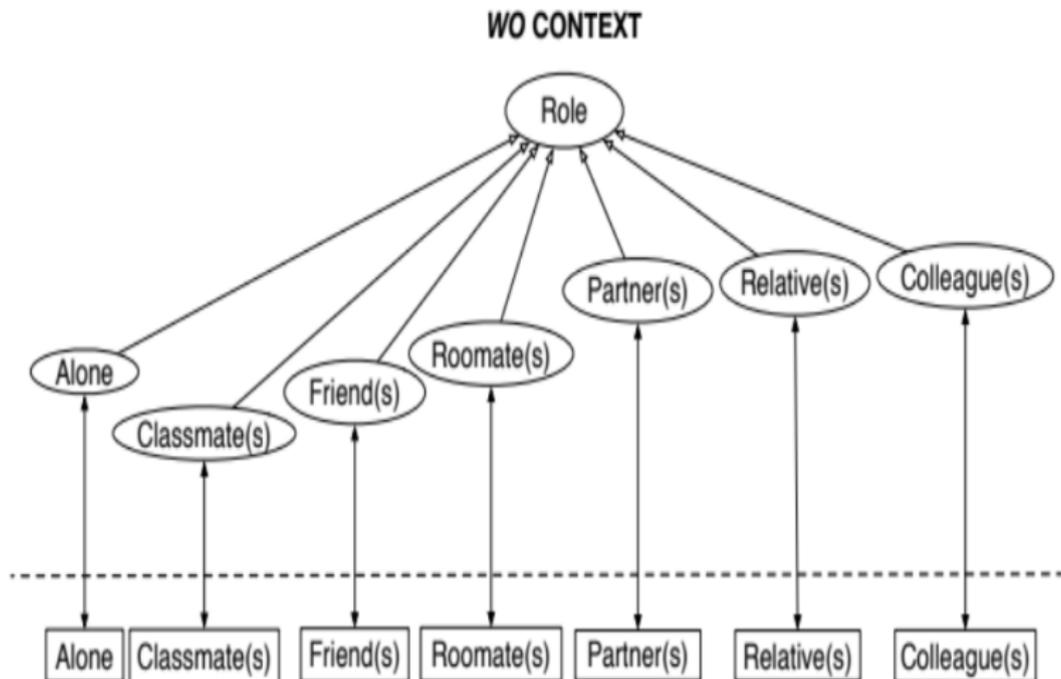
Modelling ER - Example (Contd.)

- **(Step 4:)** Relate each *function* to its (admissible) *action(s)*
- In the context of the (partial view of our) example, we decide to model the following *actions* related to the *functions* considered -
 - *PhD Student* has proper actions like *attendCourse*, *writeResearchPaper*, etc.
 - *Hostel* has proper actions like *catering*, *consierge* etc.

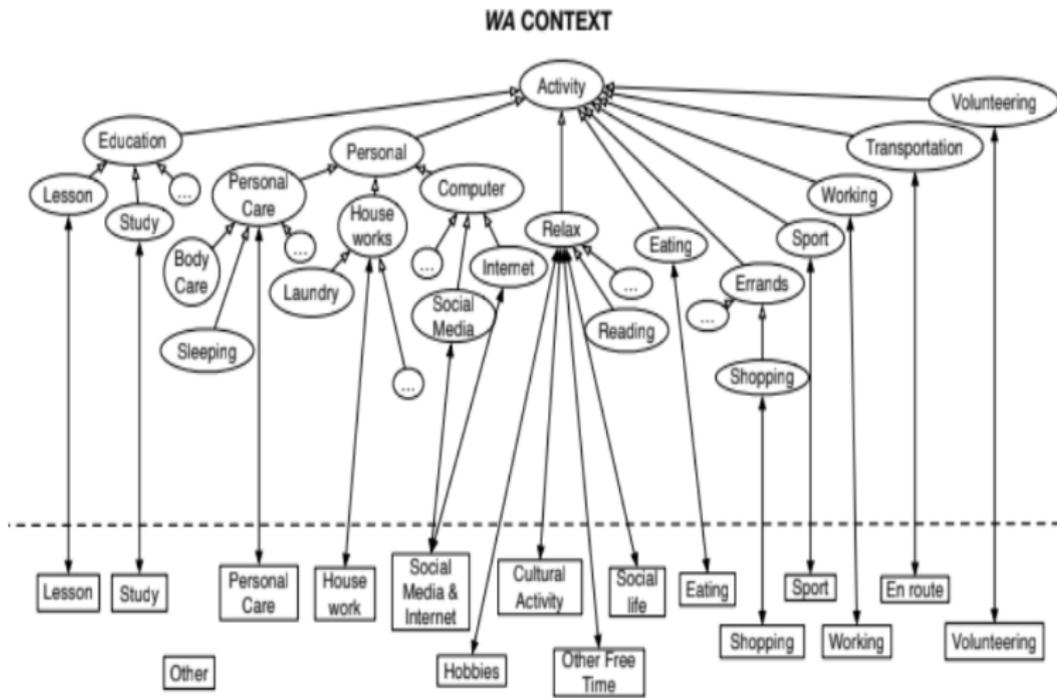
Modelling ER - Example (Contd.)

- **(Step 5:)** Relate each *object* to its (admissible) *action(s)*
- In the context of the (partial view of our) example, we decide to model the following *actions* related to the *objects* considered -
 - *Person* has admissible actions like *attendCourse*, *writeResearchPaper*, etc.
 - *Establishment* has admissible actions like *catering*, *consierge* etc.

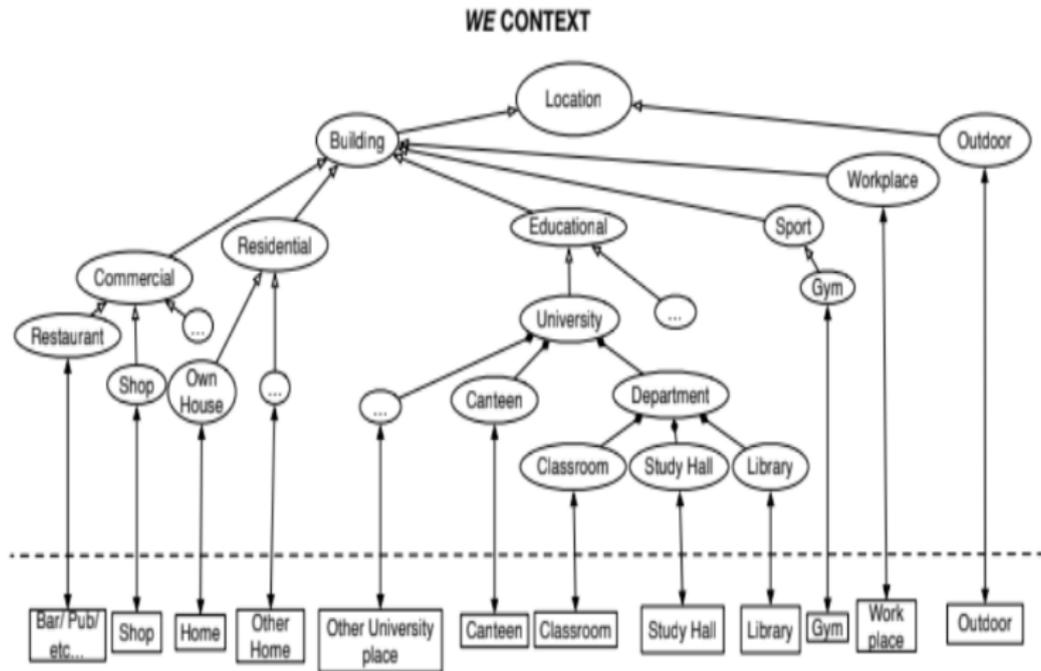
Flexible ER Modelling - Functions



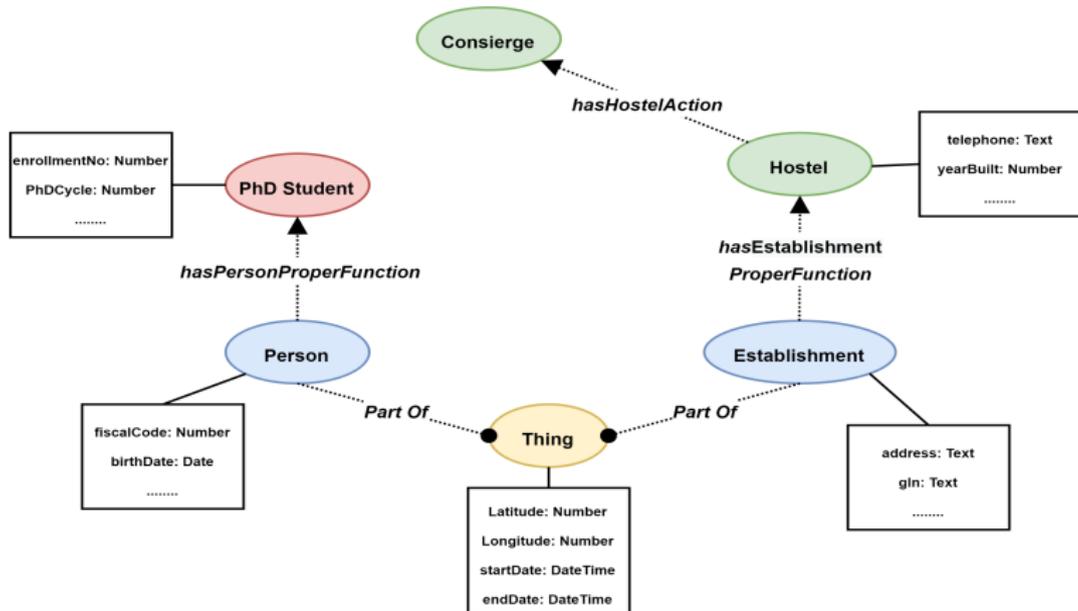
Flexible ER Modelling - Actions



Flexible ER Modelling - **WRONG**



ER Model - Informal Visualization



Legend



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Summary

- We learnt about the step-by-step general methodology for developing the ER Model
- We understood the *flexible nature* of our ER model in terms of our foundational teleology, depending on the modelling requirements (CQs) and reference context
- We saw how our methodology can be applied in real-life knowledge modelling via a small CQ from the domain of facilities for food and accommodation in Trentino
- THANK YOU !!!



KDI : Knowledge and Data Integration



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Modelling the ER

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