

# Towards key principles for teaching enterprise modelling

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LIST



# Towards key principles for ~~teaching enterprise modelling~~

learning

domain

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Discussing

# ~~Towards~~ key principles for ~~teaching enterprise modelling~~

Learning

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# A CM perspective

(Conceptual) domain modelling applied in the context of change in enterprises

EE/EA: Models used to enable informed operation, development and regulation of enterprises

# Agenda

- Why key principles?
- DM, CM, and EM
- Possible principles

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# Why key principles?

Helps to prioritise and focus the key competencies, which learners need to acquire when learning CM / DM / EM

What is, beyond specific modelling languages and notation, core to modelling?

Could help us better shape training (teaching & learning)

# Agenda

- Why key principles?
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# Domain model

*An **artefact** that is acknowledged by an **observer** as being a **representation** of an **abstraction** of a domain for a specific **purpose***

# Domain model

An *artefact* that is acknowledged by an *observer* as being a *representation* of an *abstraction* of a domain for a specific *purpose*

(Some) dimensions to define a model's purpose:

- the *domain* that the model (should) pertain to,
- the intended *usage* of the model by its *audience*,
- the expected *competences* of the (human) actors involved in the creation and use of the model

# Domain model

*An **artefact** that is acknowledged by an **observer** as being a **representation** of an **abstraction** of a domain for a specific **purpose***

A spectrum of model usage:

understand, assess, diagnose, design, realise, operate, regulate

# Conceptual (domain) models

*A domain model, where:*

- *its purpose is **dominated** by a need to*
  - *as true-fully as possible*
- *represent:*
  - *the **concepts** of the domain,*
  - *their **relationships**, and*
  - *associated **properties***

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The latter three provide the conceptualisation of the domain

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ISO/IEC JTC 1/SC 32 Technical Committee on Data management and interchange. Information processing systems - Concepts and Terminology for the Conceptual Schema and the Information Base. Technical Report ISO/TR 9007:1987, ISO, 1987.

# Conceptual (domain) models

Logic: brings discipline to the question of how to reason

CM: brings discipline to the question of what one reasons about ...

# Conceptual (domain) models

## **Combining System Dynamics with A Domain Modeling Method**

Een wetenschappelijke proeve op het gebied van de  
Natuurwetenschappen, Wiskunde en Informatica

Proefschrift

ter verkrijging van de graad van doctor  
aan de Radboud Universiteit Nijmegen  
op gezag van de rector magnificus prof. mr. S.C.J.J. Kortmann,  
volgens besluit van het College van Decanen  
in het openbaar te verdedigen op xxxdag dd-mm-yyyy  
om hh.mm uur precies

door

Fiona Penlope Tulinayo

geboren op 14-02-1979  
te Kampala, Oeganda

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# Non-conceptual domain models ...?

Models whereby the “true-fullness” to the domain may be “sacrificed” in line with a purpose to e.g.:

- Be actionable in / to a specific digital / human actors
- Be more in line with the background of a specific audience
- ..

# (Conceptual) enterprise model

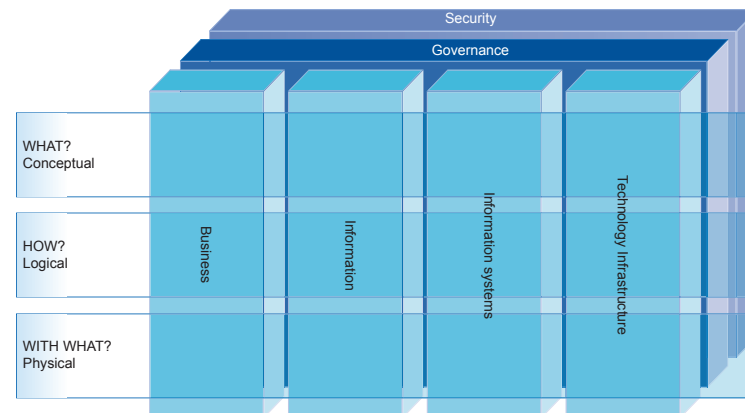
*A (conceptual) domain model of (aspects of) (a part of) an enterprise*

# (Conceptual) enterprise model

*A (conceptual) domain model of (aspects of) (a part of) an enterprise*

	Passive structure	Behavior	Active structure
Business Layer			
Application Layer			
Technology Layer			

WHY?  
Contextual



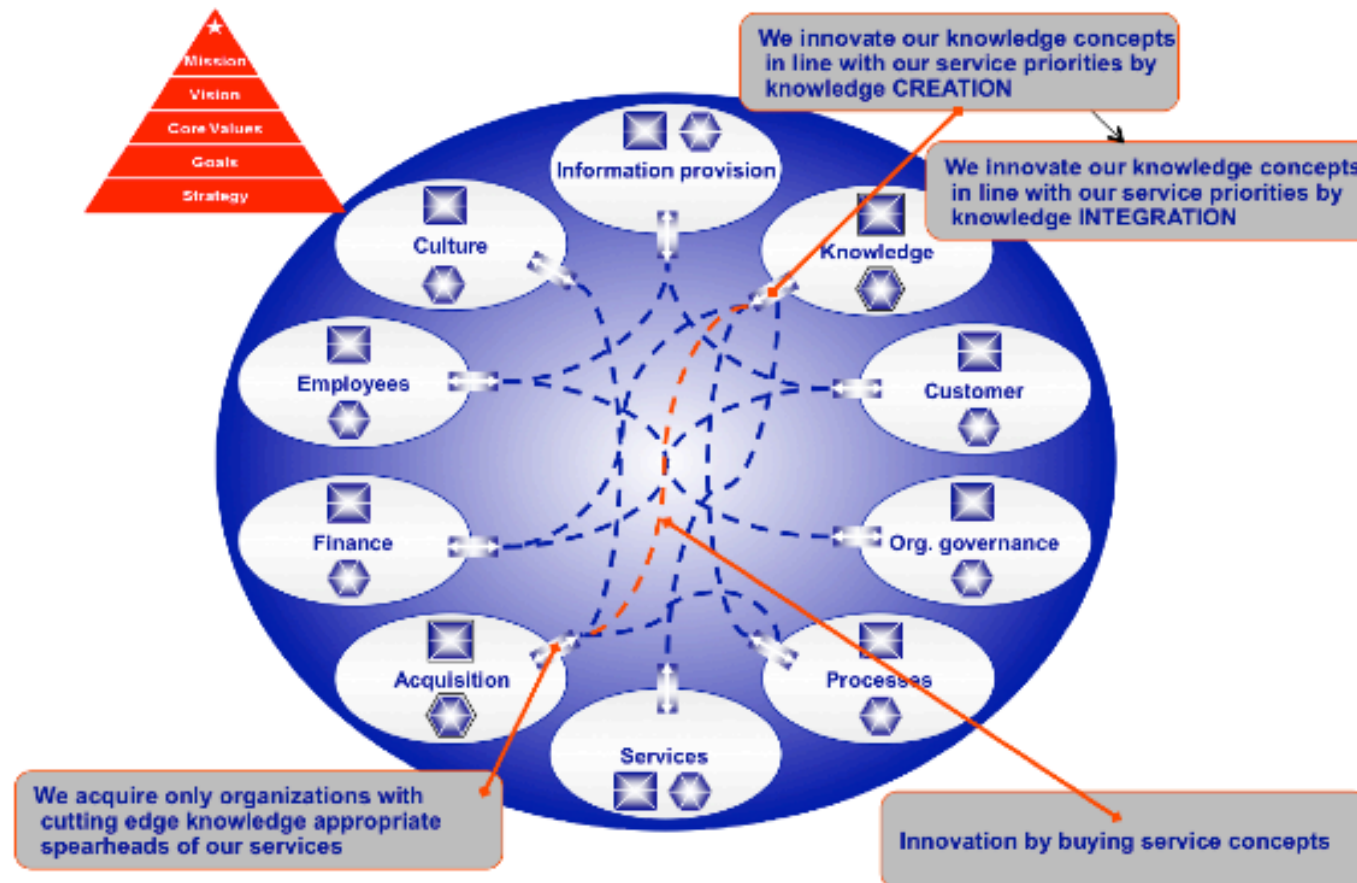
ENTERPRISE ARCHITECTURE - A FRAMEWORK <sup>TM</sup>

	DATA	What	How	NETWORK	Where	PEOPLE	Who	TIME	When	MOTIVATION	Why	
SCOPE (CONTEXTUAL)	List of Things Important to the Business	List of Processes the Business Performs	List of Locations in which the Business Operates	List of Processes Important to the Business	List of Processes Important to the Business	List of Business Goals/Strategies	List of Business Goals/Strategies	List of Business Goals/Strategies	List of Business Goals/Strategies	List of Business Goals/Strategies	List of Business Goals/Strategies	SCOPE (CONTEXTUAL)
Planner	2020 - 2025 - 2030	Function - Core of Business Process	Node - Major Business Activity	People - Major Organizations	Time - Major Business Event	End - Business Goal	End - Business Goal	End - Business Goal	End - Business Goal	End - Business Goal	End - Business Goal	Planner
ENTERPRISE MODEL (CONCEPTUAL)	e.g. Semantic Model	e.g. Business Process Model	e.g. Logistics Network	e.g. Work Flow Model	e.g. Master Schedule	e.g. Business Plan	e.g. Business Plan	e.g. Business Plan	e.g. Business Plan	e.g. Business Plan	e.g. Business Plan	ENTERPRISE MODEL (CONCEPTUAL)
Client	End - Business Entity	Proc - Business Process	Node - Business Location	People - Organization Unit	Time - Business Event	End - Business Objective	End - Business Objective	End - Business Objective	End - Business Objective	End - Business Objective	End - Business Objective	Client
SYSTEM MODEL (LOGICAL)	e.g. Logical Data Model	e.g. "Application Architecture"	e.g. "Distributed System Architecture"	e.g. Human Interface	e.g. Processing Structure	e.g. Business Rule Model	e.g. Business Rule Model	e.g. Business Rule Model	e.g. Business Rule Model	e.g. Business Rule Model	e.g. Business Rule Model	SYSTEM MODEL (LOGICAL)
Designer	End - Data Entity	Proc - Application Function	Node - IS Function (Program, Storage, etc.)	People - Role	Time - System Event	End - Business Objective	End - Business Objective	End - Business Objective	End - Business Objective	End - Business Objective	End - Business Objective	Designer
TECHNOLOGY MODEL (PHYSICAL)	e.g. Physical Data Model	e.g. "System Architecture"	e.g. "System Architecture"	e.g. Presentation Architecture	e.g. Control Structure	e.g. Rule Design	e.g. Rule Design	e.g. Rule Design	e.g. Rule Design	e.g. Rule Design	e.g. Rule Design	TECHNOLOGY MODEL (PHYSICAL)
Builder	End - System/Database	Proc - Computer Function	Node - Computer/Network Software	People - User	Time - Event	End - Condition	End - Condition	End - Condition	End - Condition	End - Condition	End - Condition	Builder
DETAILED REPRESENTATIONS (OUT-OF-CONTEXT)	e.g. Data Definition	e.g. "Program"	e.g. "Network Architecture"	e.g. Security Architecture	e.g. Timing Definition	e.g. Rule Specification	e.g. Rule Specification	e.g. Rule Specification	e.g. Rule Specification	e.g. Rule Specification	e.g. Rule Specification	DETAILED REPRESENTATIONS (OUT-OF-CONTEXT)
Sub-Contributor	End - Field	Proc - Language Unit	Node - Address	People - Identity	Time - Interval	End - Sub-condition	End - Sub-condition	End - Sub-condition	End - Sub-condition	End - Sub-condition	End - Sub-condition	Sub-Contributor
FUNCTIONING ENTERPRISE	e.g. DATA	e.g. FUNCTION	e.g. NETWORK	e.g. ORGANIZATION	e.g. SCHEDULE	e.g. STRATEGY	e.g. STRATEGY	e.g. STRATEGY	e.g. STRATEGY	e.g. STRATEGY	e.g. STRATEGY	FUNCTIONING ENTERPRISE

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# (Conceptual) enterprise model

*A (conceptual) domain model of (aspects of) (a part of) an enterprise*



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- Why key principles?
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# Philosophical grounding

Learners need to learn about the philosophical backgrounds of modelling

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Okay, not kilometres deep, but at least ...

# Philosophical ~~grounding~~ *footing*

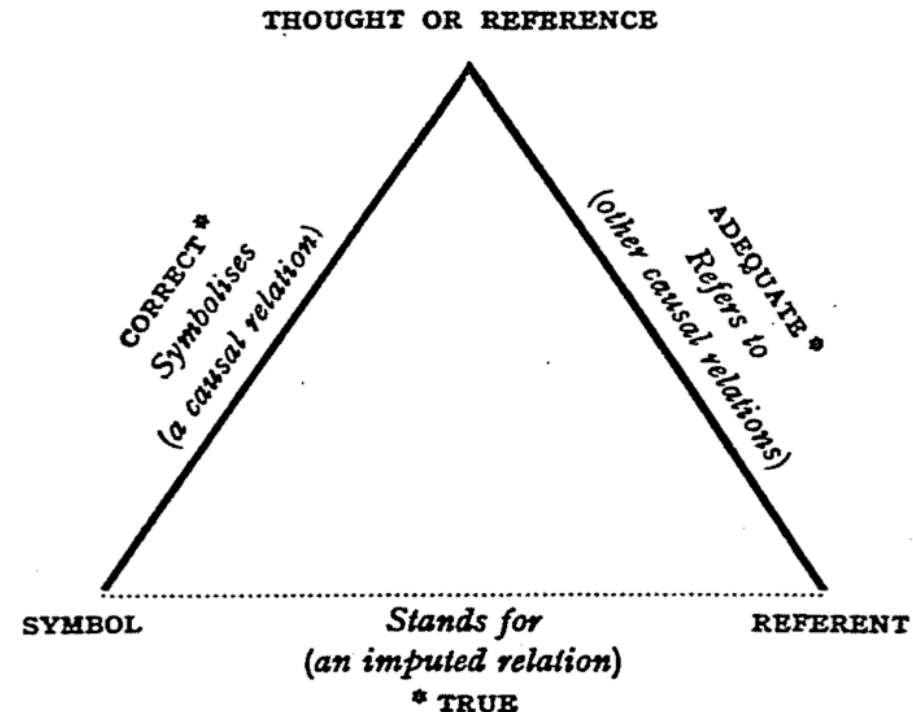
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Ogden and Richards, 1923

# Purposeful conceptualisation at the core

Learners should, first, and foremost, be able to identify the key concepts and relations, as well as associated properties in a domain

In doing so, they should also learn to use the purpose (domain, audience, usage, etc) of the model as a scoping / focussing mechanism

# Know your models ...

*“All models are wrong, but some are useful“, George Box*

Learners should know about the limitations of models ...

*Sometimes usefull. Mostly wrong.*

# Aware of one's normative frames

Normative frame:

- That what, consciously or subconsciously, influences us when creating a model
- Could be beneficial: focus, scoping, semantics, ...
- Could be harmful: framing, black swans, tunnel vision, ...

# Aware of one's normative frames

Example (sources of) normative frames:

- Modelling languages: UML, ArchiMate, BPMN, ...
- Design frameworks: Zachman, ArchiMate, EO, UML, ...
- Foundational ontologies: B(WW), UFO, ...
- Cognitive biases, due to upbringing, training, ...
- Philosophical stance: objectivist, subjectivist, ...

# Aware of one's normative frames

Modellers need to be aware of their normative frameworks and their positive / negative influences

# Notation supports model communication

Learners should become aware of the role of notation to support the communication of a (conceptual) domain model, in line with its purpose

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# Eternal RoME

Learners should be able to reason about the (needed) Return on Modelling Effort (RoME) in relation to the purpose of a model

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